

**Bob  
BROWNELL'S**

# **GUNSMITH KINKS II**

# GUNSMITH KINKS® II

A Whole New Collection of Fascinating and Widely Varied Shop Kinks, Cures To Problems, Techniques, Jokes and Comments sent by Practicing Gunsmiths from all over the World to

**F. R. "BOB" BROWNELL**

Edited and Compiled by his son  
**FRANK BROWNELL**

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GUNSMITH KINKS II - a rewarding milestone we have reached together in this wonderfully engrossing and fascinating world of Gunsmithing. Without all of you who wrote, called in, or told us your ideas and suggestions when we saw you here or at one of the trade shows - and many of you had lots of Kinks to share! - this second volume could not have been done. Nor, for that matter, would it even have been necessary!!

So - it is to you whose names and Kinks, cures and suggestions, stories, drawings, articles and charts appear on the following pages that this book is most happily and gratefully dedicated.

Special Thanks must go to my wife, Nancy, who typed many of the Kinks, did so much proofing, and put up with all the nights and weekends I was down at the office working on "The Book". (This time, however, there were no wet diapers - just the wild schedules of sports events and school activities of our 3 sons, 15, 14 and 12 - which should be enough to wear anybody down!)

Also, very special mention - and thanks - must go to Ken Raynor and Reid Coffield who worked many hours typing, organizing, checking for technical accuracy and generally jabbing me along to get the book finished! And, to Larry Weeks, whose crew did the layouts and paste-ups.

So - a very special "Thank You" to all of you who helped make GUNSMITH KINKS II the unique and amazing book that it is.

Frank Brownell

*Montezuma, Iowa*  
*September, 1983*



## FOREWORD

The fourteen years between the publication of Volumes I and II of GUNSMITH KINKS have been years of advancement and change in the gunsmithing profession. New vistas have opened for the Novice wishing to make gunsmithing a profession. . . A vast network of gunsmith owned and operated warranty stations have opened across the Nation. . . Jigs and fixtures have been uniquely developed making possible all kinds of exotic and sophisticated tune-up and special-built jobs on rifles and pistols. . . Books are now available that weren't even ideas in some writers' minds when Volume I was published. The ranks of Master Gunsmiths are showing a healthy, robust growth. Many of the super gun builders of today were just pulling their first walnut slivers out of their novice fingers a decade ago; others hadn't even thought of gunsmithing yet. Many who were the Masters then are now the Elder Statesmen of our Gunsmithing Fraternity.

To say that it has been a fascinating privilege to have been an active part of this evolution is to put it mildly. Working today with men who wrote us letters many years ago that started out, "Could you tell me how to get started to learn to be a professional gunsmith?" and seeing them now as recognized tops in their field is fulfillment indeed!

Yet, with all the evolution, the improvements in tools and technique, the books & magazine articles, the great need still remains for that little gimmick that gets the impossible job done . . . the Gunsmith's Kink. Accumulating those Kinks for you has been the topping on the pudding - fun, educational, engrossing. Putting it all into a comprehensive, well-planned book has been equally rewarding for Frank Brownell and his crew who, because of their devotion, feel as close to the fraternity as I.

As I said in the Foreword for Volume I, ". . . the ingenuity of the independent American Gunsmith knows no bounds. . ." Now I want to add simply this: read the pages following in this book and *Believe It*.

Bob Brownell

*Montezuma, Iowa*  
*September, 1983*

**CARTOON CREDITS:**

*Bob Albrecht, The Dust Jacket, page 441; William B. Coffield, page 163, 181, 269, 279; Bill Mauldin, page 309; Merl Ray, page 295; C.K. Rich, page 141.*

**DRAWING CREDITS:**

*Special thanks must be given to M.C. Ray who so obligingly assumed the duties and headaches of "staff artist" for **Gunsmith Kinks II**. Without his special skills and expertise we would be missing many, many of the fine drawings that accompany the written Kinks. Thanks, Merl!*



## CHAPTER 1

# THE GUNSTOCK



*Eat A Live Toad The First Thing Each Morning  
... And That Will Be The Worst Thing You'll  
Have To Face All Day!*

### SOME OF THIS AND SOME OF THAT

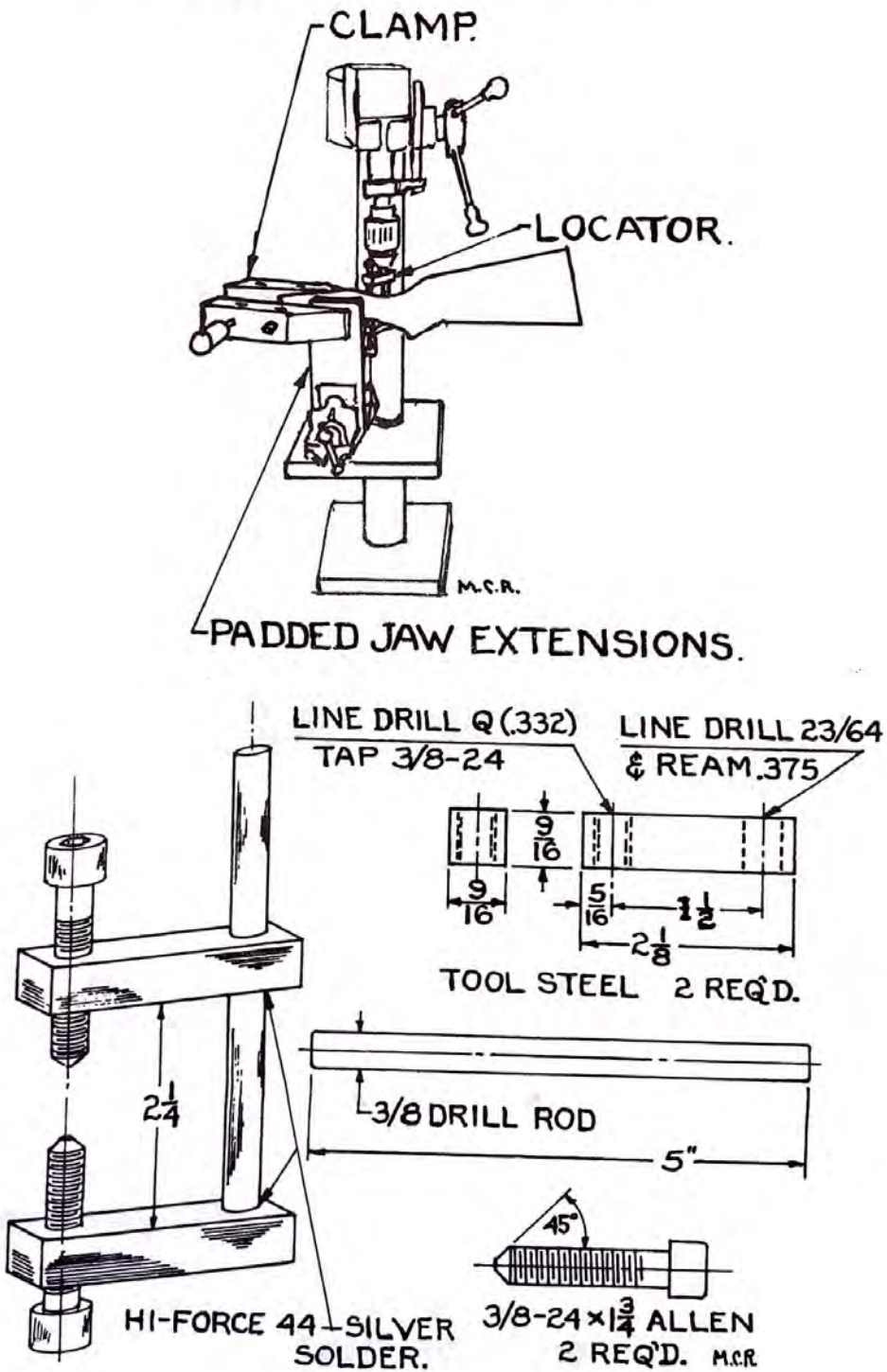
(1) When refinishing a gunstock, put a couple of extra long wood screws into the buttplate or pad holes to keep the edge of the



stock from touching the bench. (2) Before starting each new job, put down a new cover of newspaper on your bench . . . and throw it away when you're through with that job. Protects fresh bluing, soaks up drops of oil, etc., won't scratch gun stocks, and when you've made a mess, makes clean-up a whole lot easier!

- Tom Kahaly, Riverdale, New Jersey

## GUNSTOCK HOLE LOCATING FIXTURE



This fixture accurately positions a stock in the drill press for



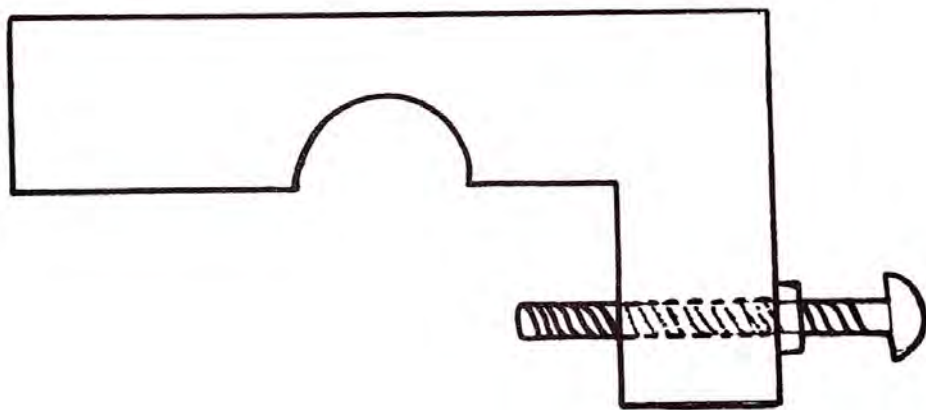
drilling the tang hole through the stock in perfect alignment with the action tang holes.

With locating fixture held in the drill press chuck, place the stock in the padded vise jaw extensions and snug up the two Allen head screws to retain the stock in correct position. Place the hardwood clamp on the vise jaw extensions and tighten to securely hold the stock in correct position. Then, remove the locating fixture, insert the proper drill in the chuck and drill the hole through the stock. The drilled hole will be in perfect alignment.

*-Jack Gutridge, Dyer, Indiana*

### STOCK FOREND THICKNESS GAUGE

I don't know about others, but getting the same thickness of wood from the centerline on a rifle stock takes a bit of doing and some time, what with the curves, etc. I made up two jigs, one for



out on the barrel, and one for the front receiver ring. These can be wood, or aluminum, and are adjustable so that a final dimension can be made on one side, and the other side made to match. Hole for fitting over barrel can be about 7/8" and for receiver ring about 1-1/2". Bolt can be 1/4" x 20".

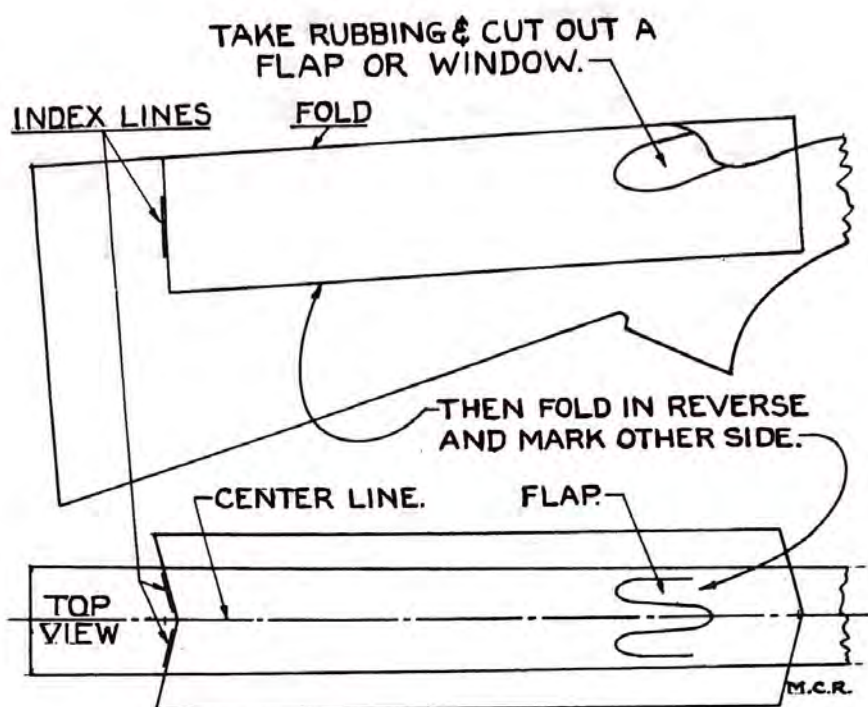
*- Horace Frantz, Allentown, New Jersey*

### MATCHING UP THUMB FLUTES ON STOCKS

Unless you are an experienced stockmaker, there are times when you will have trouble getting the thumb flutes placed evenly on a stock. (Come to think of it, I've recut a few myself.) However, here is an easy way to do the job that will work every time, as long as both sides are contoured evenly.

First, go ahead and cut in one flute, then place a centerline along the comb and top of the grip. Fold a sheet of paper in half so the edges are even and align the fold with the centerline. Mark a small index line at the point on each side of the stock where the rear edges of the paper come. Then just make a rubbing of the





flute with a pencil.

Refold the paper after cutting the rubbing (makes sort of a window), and replace it along the centerline. Be sure to bring the rear edges of the paper back to the index lines. You now have an outline, in reverse, of the flute from the reverse side. Just mark it in with a pencil and cut or file within the outline.

Both flutes will now match, as long as you are careful in cutting in the second one.

*- Dick Thaxton, Broomfield, Colorado*

## HOME-MADE DEEP-HOLE DRILL

When a small diameter hole is needed through wood that is longer than the drill bit you have, you can use a piece of drill rod. Just select the diameter rod wanted, and sharpen the end like a twist drill. You will have to withdraw the "drill" often to clean out the hole and remove the chip, but this technique has saved my life many times.

*- Bryan Burgin, Sidney Center, New York*

## THE 'ECK YOU SAY

Having a complete understanding of a job, words, phrases, letters and pronunciation is always quite important. Proof of this is in this little squib from the book *Nimitz*: "Another favorite story of Nimitz's told of a British gun instructor, a sergeant, who was addressing a class of student officers. "'Eretofore," said the instructor, "we 'ave used 'ard woods for gun stocks—hoak and hash and hoccasionally 'ickory—but 'ard woods is becoming hin-



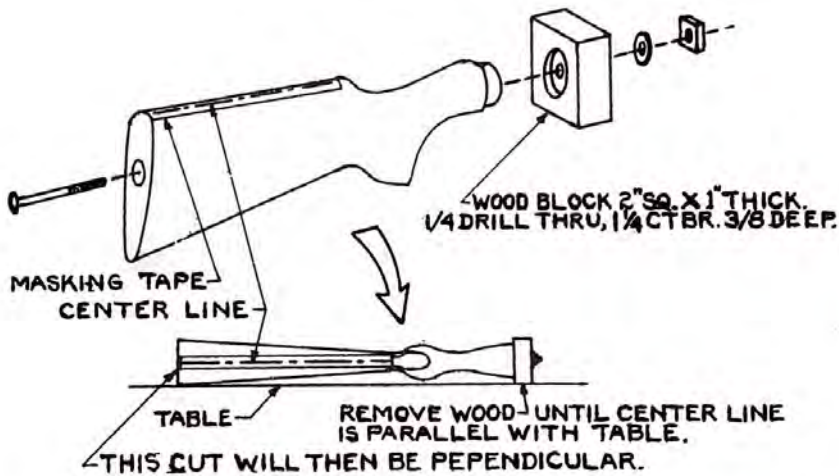
creasingly rare." From the rear of the room came a voice with an Oxford accent: "Do you by any chance mean oak and ash and hickory?" Replied the instructor: "Hi means hoak and hash and 'ickory; them is the 'ard woods Hi uses for my stocks. Now there is lignum vitae, a very 'ard wood, and water resisting to boot. In fact, it is hextensively used for piles for piers—and for the benefit of the hover-hedicated bastard in the back row, when Hi says piles for piers, Hi dont hintend to convey the hidea of 'emmeroids for haristocrats."

(Wish I had more dope on the book. Sounds like it would be fun to read—BB.)

- Bob Young, Gardena, California

### DUAL PURPOSE SHOTGUN BUTTSTOCK GUIDE

While refinishing a Winchester Model 12 buttstock recently I cut a block of wood 2 inches square by 1 inch thick and attached it (per the enclosed drawing) to the front end of the buttstock. That way I wouldn't round off any of the stocks edges that joins the



metal. To hold the block to the buttstock, an ordinary 1/4 inch by 6 inch stove bolt was used through the existing hole in the stock.

Later I discovered that the block of wood also held the front of the stock parallel to the saw table for cutting off the butt squarely before installing a new recoil pad.

Actually, the block can be used for four different model shotguns by rotating the block a quarter of a turn for each model as long as they all have the same tenon diameter.

(Note: If you can measure the thickness of the buttstock then you can make the dimension of the front block, from the centerline of the 1/4 inch hole to one edge of the block, 1/2 of that dimension. Then only minimal dressing of the block would be needed to keep



the stock exactly parallel to the table.)

- Mike Parker, Washington, D.C.

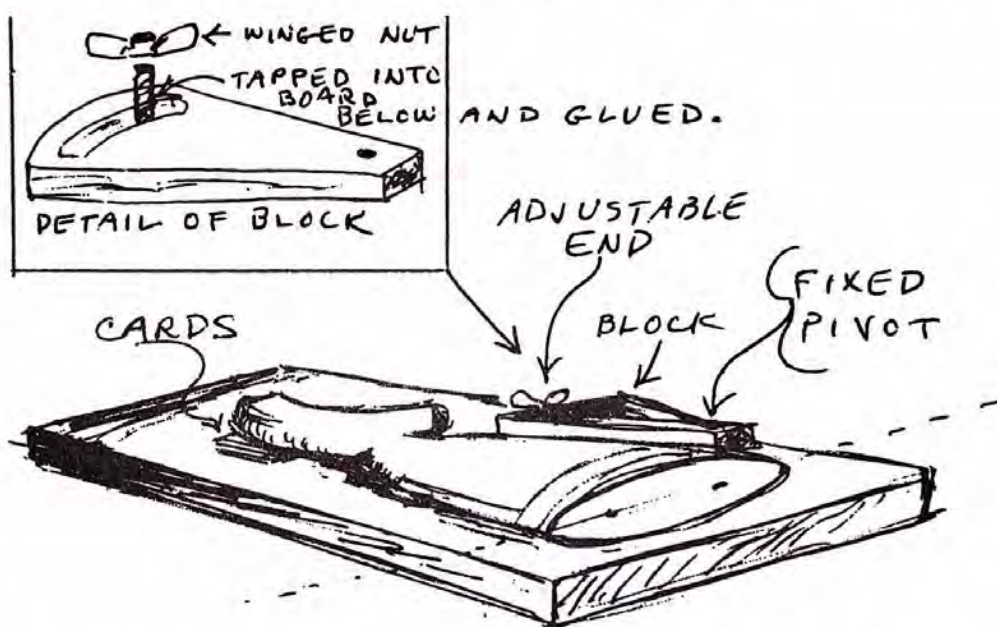
## PROTECTING STOCK FOR SAW CUT

I have found that two layers of 3/4" 3-M Scotch Brand Drafting Tape does a beautiful job of protecting the finish at the saw cut when shortening a stock to install a pad. It does not lift the finish and there is no sticky residue to clean off. Remember, tho, if the blade isn't keen and sharp nothing will help much. . . .

- Bob Gruebel, Nacogdoches, Texas

## BUTT STOCK LEVELING

To level up a stock for cutting prior to installation of pad, fit calipers across thickest part of stock and lock them. Move calipers



to thin end of stock and fill gap with cards from old poker deck (not marked ones!). Count cards needed to fill gap and discard half of them. Use a jig such as one in drawing, slip remaining cards under thin end of stock. It has gotta be LEVEL. I use no holding device, just a SHARP saw!!

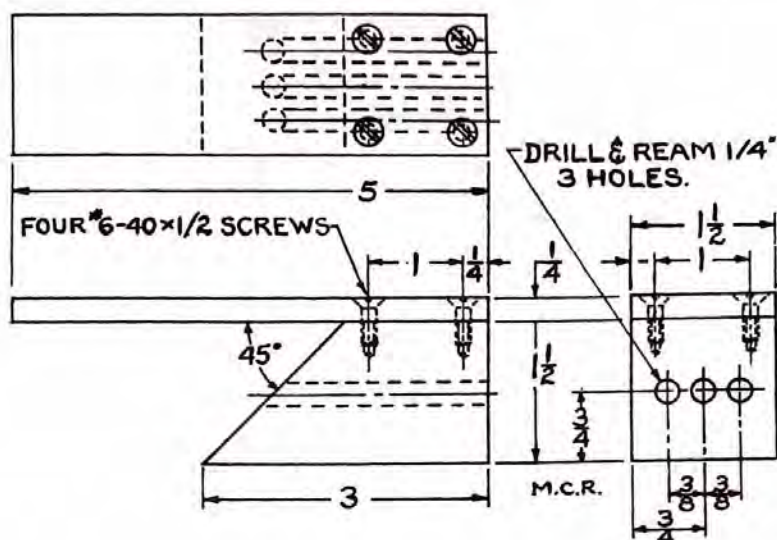
- Ken Hogg, Dothan, Alabama

## FOREND TIP DOWEL JIG

The drawing is of the jig I use for drilling the dowel holes in both the stock and forend tip. I made mine out of stainless steel so I wouldn't have to oil it for rust protection and then have to worry about getting some oil on the new stock.

To use, slip the tip wood into the jig, lock in the vise and drill the holes. Next clamp it on top of the stock with a "C" clamp and





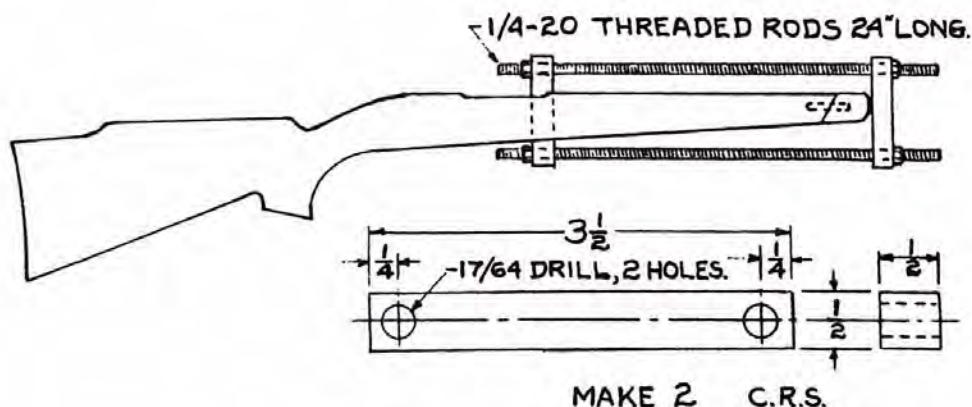
drill these holes. Presto! Instant alignment.

I have put three holes in my jig for a couple of reasons. If the stock is wide enough, the two outer holes can be centered in the stock to keep it and the forend piece from wanting to twist against each other. But, if the stock is very narrow, the middle hole can be easily centered. Also, by removing the four screws and rotating the block 180 degrees, the jig can be used for drilling forend tips that are cut at 90 degrees to the bore line.

- Bob Blackburn, Fort Worth, Texas

## FOREND TIP HOLDING FIXTURE

This fixture securely holds the forend tip on the stock until the



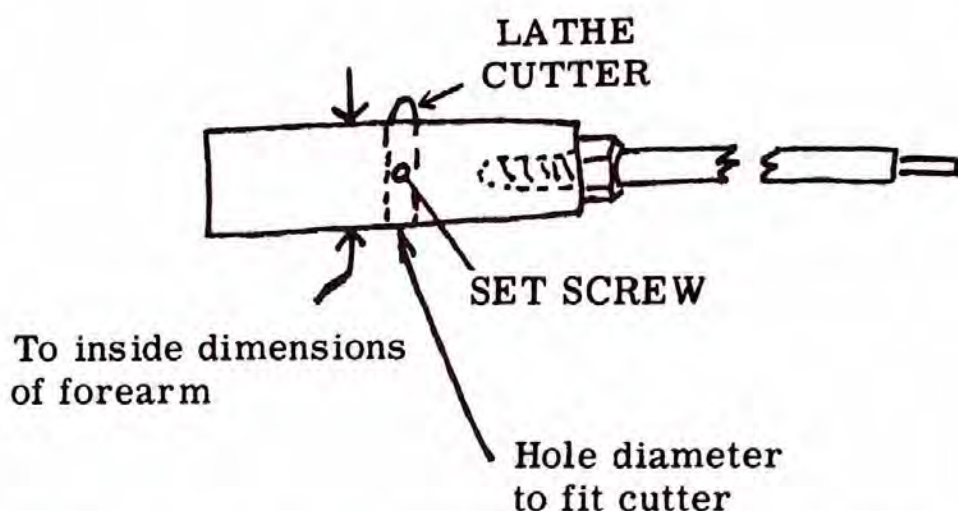
glue is thoroughly dry. I've used mine for 8-10 years with absolute success every time.

- Jack Thompson, Birmingham, Alabama

## FITTING REPLACEMENT SHOTGUN FORENDS

About half the time I order a replacement forend stock for a shotgun, it comes in just a little too tight to go over the forend





iron. I have tried everything to take just a little wood out of the inside of these and it is a pain in the a--. I finally made me up a tool for doing the job. See enclosed sketch.

*-Jim Thompson, Topeka, Kansas*

### **BLADE GUIDE FOR STOCK BOLTS**

To keep from getting the screwdriver blade alongside the stock bolt in rifles and shotguns that have them, I slip a slotted knock-out plug from an electrical box on the blade of the screwdriver and tap it on lightly so it won't fall off. It keeps the screwdriver from getting along side the stock bolt head, making you think that it is in the slot. It's mighty important you don't do that, for if you get your screwdriver in this position and put pressure on the blade, you could split the stock!

*-Andy Campbell, Safford, Arizona*

### **AT LEAST HIS BLUING TANKS WILL STAY HOT**

The spiritualist seance neared the climax, and contact was about to be made with the departed gunsmith - an irascible old individualist who'd controlled his clientele with an iron fist and had been loved by all of them. The little widow, a bundle of nerves under the circumstances, tensed herself for the first message from her late husband. Finally it came through, transmitted by the medium. The departed gunsmith's one request, to everyone's surprise, was that he be sent a box of dollar cigars. "But" protested the tearful widow "how do I know where to send them? He didn't send any address." "Well, my dear," answered the medium, "He didn't ask for any matches, either!"

*-Bob B.*

### **STUCK BUTT STOCKS**

On stocks with a horizontal butt stock screw that resists all of



your efforts with the stock screwdriver - remove the screwdriver. Fold a regular face towel into fourths and lay it across the butt of the stock. Hold the stock in your left hand (if you're right handed!), butt towards the ceiling, action towards the floor. With a RAWHIDE mallet strike the butt of the stock on the folded towel two good whacks. Now try the stock screwdriver again. 99% of the time the screw will come out with little effort. This method pulls the action against the wood just enough to break the seal, and yet it does not damage the inletting or fit of metal to wood.

- *Ralph Walker, Selma, Alabama*

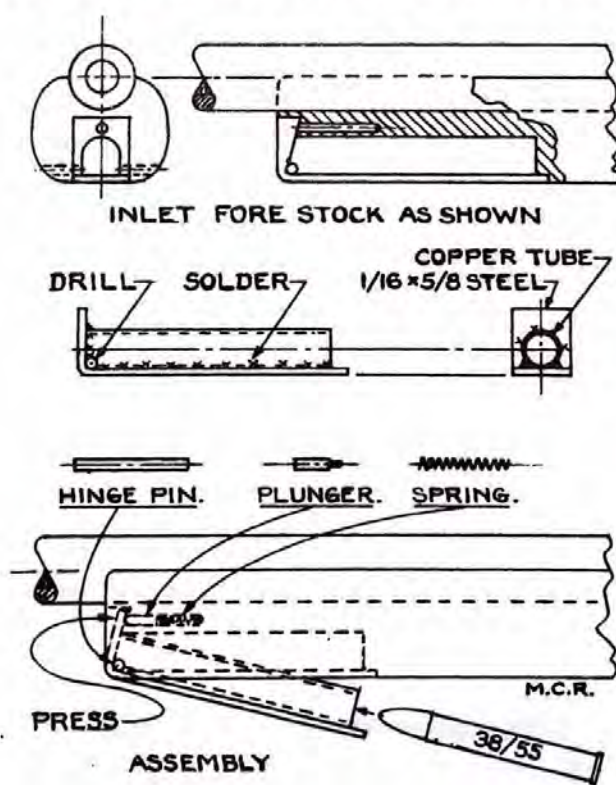
### MOUNTING THE REAR SLING SWIVEL SCREW

The best way to thread that rear sling swivel stud into the stock after the recommended hole has been drilled is to remove the drill from the press and replace it with the stud. It's a simple matter to bring the stud down into the drilled hole and turn the spindle by hand while exerting sufficient down pressure on the quill to get positive threading.

- *Ronald Prichard, Ketchikan, Alaska*

### FOREND CARTRIDGE HOLDER

The enclosed drawing may not be much of an idea, but it sure



beats running around the hills with extra cartridges sticking out between the fingers of ones left hand. Handy, too!

- *Jim Campbell, Mesa, Colorado*



## **ANCHOR IN THOSE STRIPPED-OUT WOOD SCREW HOLES**

Anyone having trouble with stripped screw holes in wood such as buttplates, trigger guards, sling swivels and so forth need only go to the local hardware store and get some of the nylon 1" x 1/4" caulking anchors. Enlarge the hole to the proper size and tap in the anchor. Never had one fail yet and oil and moisture do not seem to affect them. Besides, they're hidden under the work and are a lot easier to do than drilling and doweling when the whole area may be oilsoaked and the glue won't hold anyway.

*- Bob Hutson, Ararat, North Carolina*

## **STEEL WOOL SCREW TIGHTENER**

As you know, it is quite common for a shotgun to come in for repairs that requires the butt plate or recoil pad to come off to remove the thru stock bolt. When reassembly time comes, the wood is often stripped out so that the pad screw or screws won't tighten up. Usually this means a drill out, dowel & glue, and redrill job. I discovered that by putting a bit of steel wool into the hole with the screw that it tightens up beautifully... in fact, takes all the hand pressure I can give it!

*- Will Fowler, Anchorage, Alaska*

## **SCRAP WOOD GOLD MINE**

I save any damaged stocks I replace and the pieces of buttstock cut off when I install recoil pads, too. Even in my small shop I've collected quite an assortment of wood of varying colors, grain and figure. Over the years, this supply of well seasoned wood has been invaluable for making repairs on chipped forends, broken off toe areas, etc. Several of the pieces have matched customers' wood so well that I'd swear they came from the same tree. With a proper match, the finished job ends up looking far better than the customer's wildest dream.

*- Reid Coffield, Rutherfordton, North Carolina*

## **IF ITS NOT ONE, IT MUST BE THE OTHER**

After completing a most interesting and rewarding tour of the Convention floor of a recent National Rifle Association show, I was discussing the incredible gun work that was on display. The ultimate in fine craftsmanship was something to behold. I was discussing this fact with one-time Director of Advertising for The American Rifleman, Fred Moulton, and wondering just how these men achieved such ability. His comment: "I've observed that famous gunsmiths are almost universally composed of men who



were smart enough to know they could do the job - or those who were just too dumb to know that they couldn't." Come to think of it, this seems to fit most of us in the gun business. When I told Fred's comments to my wife, her comment was about like your wife's is going to be: "Guess you know into which group that puts you!"

- *Fred Moulton, Washington, D.C.*

### **BEESWAX FINISHING NAILS FOR NO SPLITS**

Learned this as a kid watching an old Swedish cabinet maker who worked for my dad. He carried an old flat iron around with him when doing finishing work. Before driving the nail he would hold it straight up with the point resting on the iron and give the head of the nail just enough of a tap to flatten the tip a bit. Thus the nail "crushed" its way thru the wood without separating the grain as a pointed nail will do. He also stuck the nail into a bit of beeswax when working on very hard and dry wood.

- *Bob B.*

### **BEESWAX ON STOCK SCREWS**

An old cabinet maker told me to not drill any pilot holes except to get the screw started - but to rub beeswax onto the screw before turning it in. . . I'd hate trying this on a hunk of really valuable wood. (Comment from Bob B. - Me, too! I'd still drill the pilot hole but ALSO use the beeswax.)

- *Billy Bunnell, Trenton, Nebraska*

### **CLEAN OUT THE CRACK FOR BETTER STOCK REPAIR**

It is often necessary to repair cracked or split stocks for customers and on guns taken in on trade. This is usually a routine job, but now and then an old split will be filled with dirt and grime or, even worse, someone may have already made a poor attempt at gluing things back together, making the job a bit more complicated. I find that a small circular wire brush in the Dremel Moto-Tool worked with the grain of the wood does a fine job of removing dirt, grime, old glue, etc., as well as 'texturing' the wood for a good glue surface. No wood is removed, resulting in a clean textured joint that fits back together better than most jigsaw puzzles. The biggest secret to a strong repair around an action, tang, etc., is a good glass bedding job after the split is repaired, since most splits were caused by poor or loose bedding in the first place.

- *Ronald Bearer, Delta, Colorado*



## REMOVING OIL FROM HIGH GRADE DOUBLE STOCKS

If you are patient and can wait it out, this works. 1) Saturate the stock in solvent (like trichloroethane) and immediately spray with Texize K2r or White Magic or HR Spot lifter from grocery store. 2) Let sit for several days until the white powder turns brown. Since it is hydroscopic, keep in a dry place. 3) Brush off powder and repeat the saturating in solvent and spraying with spot lifter. 4) Repeat as many times as necessary to draw out all oil. 5) Use methanol to clean up after the last spot lifter treatment. 6) Possibility of getting the wood too dry, so watch it. I have not had any trouble.

- Dr. Swan Richardson, Stephenville, Texas

## ACRAGLAS® INSTRUCTIONS & TECHNIQUE

### Inletting

Allow 1/16" to 1/8" clearance in barrel channel and behind recoil lug. The wood should be left rough rather than sanded smoothly - not to increase strength of ACRAGLAS® Bedding bond-to-wood, but to add strength to the wood itself by creating more exposed wood surface and thus realizing the full advantages of ACRAGLAS® strength-giving qualities.

### Metal Preparation

#### Release Agent (Shake Vigorously or stir)

Use sufficient agent on all metal surfaces which might come in contact with ACRAGLAS®. Apply two coats to insure agent reaching all exposed metal surfaces. ACRAGLAS® is a powerful bonding agent capable of permanently attaching barrel to wood and requiring an axe or chisel to remove! The proper use of ACRAGLAS® Special Release Agent prevents this bonding. **Note:** - Fill milled out sections in metal with putty, modeling clay or plastic wood, smooth with a spatula, cover with waterproof tape and apply release agent over tape. Apply Thin coat of gun grease, or paste wax, over guard screws after agent dries on them. When bedding job is completed, release agent can be removed from both gun and bedding with warm water. (Release agent can be thinned with alcohol.)

Be certain release agent is **Thoroughly Dry** before bedding.

Gun & Release Agent must be room temperature (72°F.) or higher when used.

### Special Note Regarding Following Instructions:

Follow measuring instructions closely. The use of additional



Hardener will not make your **ACRAGLAS®** Accurizing compound set up faster. Too much Hardener will actually cause the mixture to set up improperly or not at all. The instructions are complete and easy to follow. Following them will insure positive and consistent success every time.

### Proper Mixing of **ACRAGLAS®** Components

Be sure wood is clean and oil free.

Mixing Ratio is 4:1. Into graduated cup pour 1-oz **ACRAGLAS®** Resin. Just before 1-oz mark is reached, stop pouring and allow Resin to level in cup. Then **Slowly** pour balance needed to line on cup. Add 1/4-oz **ACRAGLAS®** Hardener, using same pouring procedure. Be sure cup is level for accurate readings. **Note:** Adding too much Hardener prevents proper hardening.

Puncture the package of **Dye** included in the kit with a pin and add a very small amount to the mixture. Observe the time closely and stir the mixture (do not whip) to evenly distribute the **Dye** throughout. Add more **Dye** if needed. Remember, it is better to have the **ACRAGLAS®** a shade lighter than your stock than to have it too dark. **ACRAGLAS®** **Dye** is very powerful and a little goes a long ways.

**After Two Minutes** (timed) **Stirring**, add one-half the packet of **Floc** to the mix - smaller amount of floc if lesser amount of **ACRAGLAS®** is being mixed. Smooth floc out on side of cup while mixing. Stir for **Two Minutes**. (Total elapsed time from when you first started stirring is now 4 minutes.)

Your **ACRAGLAS®** is now ready to be applied. See "Bedding" below.

**Time/Temperature Note:** At 72-75° F. **ACRAGLAS®** mix will harden in cup in 12 to 14 more minutes. Just before kicking over and hardening, the cup becomes too hot to handle. This is normal and indicates proper mixing.

At temperatures higher than 72-75° F., the mix will harden more rapidly, giving less working time. The in-cup hardening can be slowed down by setting the mixing cup in a shallow pan of cold water at this point and stirring from time to time. See below for in-stock hardening time and additional information under "Important".

### **ACRAGLAS®** Bedding

With paddle, spread the prepared **ACRAGLAS®** in a ridge down center of barrel channel to prevent air being trapped when barrel is seated. Also fill recoil lug recess sufficiently to completely fill recess when fitted. Firmly press in barrel and action to desired depth. You may find you will prefer **ACRAGLAS®** recoil lug



and other gaps between receiver and wood first and then, when thoroughly cured, **ACRAGLAS®**ing the barrel and channel.

When **ACRAGLAS®** shows signs of hardening - (generally an hour or two after application, altho working time is but 15-20 minutes) remove surplus exposed **ACRAGLAS®** with a dull knife or spatula, being careful not to scratch gun bluing. Leave a very small bead of **ACRAGLAS®** above wood between stock and metal to be sanded to contours of stock after final curing.

Under normal conditions gun can be removed from stock within 24 to 36 hours. In cases of extremely tight fits, the careful use of a soft rubber mallet will help in getting gun and stock apart. Should you find voids (bubbles or the like) between metal and **ACRAGLAS®**, these can be filled by applying fresh mixed **ACRAGLAS®** in minute quantities and re-bedding barrel and action. Bonding will be complete and as strong as if void had not existed. Be sure voids to be filled are completely free of Release Agent before filling.

### Making Repairs With **ACRAGLAS®**

**FOR REPAIRS:** Mix **ACRAGLAS®** Resin and Hardener in proportions as above. Do not use floc. Stir four to five minutes for best bond and strength. Use as you would any cement but remember that **ACRAGLAS®** is one of modern science's strongest bonding agents. Properly applied, broken or split stocks can be as strong or stronger than when new. When filling gouges or bad dents in stocks, add Floc as for bedding. Color may be closely matched by adding dye in small quantities. It is better, when repairing, to have **ACRAGLAS®** lighter rather than darker than wood.

**TO MIX SMALLER AMOUNTS of ACRAGLAS®:** Figure 1/4th teaspoon Hardener to 1 teaspoon RESIN - or similar proportions in any amount desired. Use metal (and not plastic) measures. However, Polyethylene measures are ideal.

As **ACRAGLAS®** shrinks less than .1 of 1% when hard, it is not necessary to clamp joined parts other than to hold such parts in a given desired position.

### IMPORTANT

**IMPORTANT:** - Because **ACRAGLAS®** depends upon its own internally created heat for hardening, the Resin and Hardener should be warmed to room temperature (approx. 72 degrees F) in cold climates during the winter months prior to measuring. If barrel and stock are cold, they can be warmed over heat or in the sun until they feel warm to the touch. Chilled Resin and Hardener are quite thick which makes them difficult to accurately measure. (Because of pile-up in cup.)



For Accelerated set up of bedding, barrel and wood should be heated until they feel quite warm to the touch.

For RAPID setting: use heat lamp 12" to 18" away from area where **ACRAGLAS®** has been applied. Note: Adding too much Hardener PREVENTS complete hardening.

**ADDITIONAL INFORMATION:** The basics of **ACRAGLAS®** (which we have had adapted to gun work) are those recently developed for the Aircraft & Automotive industries. **ACRAGLAS®** is acidproof, waterproof and weatherproof. It has greater strength than steel, has superior electrical insulating qualities, resists alkalis and will never rot or deteriorate. It is highly resistant to impact and will not dent; should it ever be damaged or if an improper job is done the first time, it can easily be corrected or mended by using the same materials as in the kit. Sanding can be done by hand or machine, using open grit and slow speed—less than 1600 r.p.m. Bright finish can be obtained by buffing with a linseed-oil-soaked cloth polishing wheel following sanding.

Unlike paints or air drying plastics, **ACRAGLAS®** Bedding hardens by chemical action, so a hard surface indicates a hard interior ready for finishing. The mixture becomes hot before reaching setting temperature - it then kicks over and begins to harden, reaching full hardness after 48 hours, altho it can be worked, sanded and finished before then.

**STORE IN COOL PLACE.** Shelf life of unmixed **ACRAGLAS®** is four years.

## MORE ABOUT YOUR **ACRAGLAS®**

Professional gunsmiths and prize winning shooters not only report great accuracy improvement on all bolt action rifles when using **ACRAGLAS®** but also write that other guns benefit when accurized with **ACRAGLAS®**. The accuracy of two piece rifle stocks, such as the Savage 99, Winchester Hi or Lo Wall, Marlin and others shows great improvement if the forearm is **ACRAGLAS®**ed. If there is any question of fit of stock to receiver, a thin line of **ACRAGLAS®** between stock and receiver will help.

Numerous Armed Forces shooters advise that the Garand will hold slightly tighter groups if recoil contact points are **ACRAGLAS®** reinforced.

Occasionally shotguns will "shoot loose" where the frame meets the butt stock. A thin application of **ACRAGLAS®** at these points will not only tighten up the gun but will also prevent slight pitch change - which can cause slight over or under shooting.

Loose or poorly fit pistol grips can be made firm and tight fitting by the proper use of **ACRAGLAS®**. Also, expensive custom



made target grips which have cracked or split are easily repaired with **ACRAGLAS®**; or, if they have warped away from the frame causing unsightly gaps or sloppy fit, **ACRAGLAS®** will correct these errors.

- *The Crew at Brownells*

## ACRAGLAS AND HIGH TEMPERATURES

I was asked by one of the magazines to give full technical information to them regarding the effects of heat on Acraglas. Not knowing all the answers I contacted a friend who spends his time going around to big industry giving in-plant lectures on the uses of epoxies. Normally I wouldn't give so much space to one of our products, but practically all of you use Acraglas for a whole host of things around the shop, so this information will be of great value to you. Visited with him for about an hour and was one of the best things I've done in months!

**Heat Damage:** - Epoxy does start losing strength at 160°F. and at 600°F. there is a physical degradation of the organic bond and at temperatures above 600°F. a sort of "charring" effect will be noted. At 310°F. (maximum bluing tank temperatures) Acraglas will become relatively "soft" but, and here is a very important feature: at return to room temperature it will be as strong as before heating. This return to normal strength is characteristic up to temperatures approaching physical degradation. As no gun is subjected to these temperatures without other serious damaging effects, bluing a gun that has had Acraglas used in the barrel relining operation or scope base build-up, for example, will have no effect upon the strength of the epoxy or the bond. **NOTE** — Parts joined with Acraglas and subjected to high temperatures should not be moved while at such temperatures for they will be re-joined at the new position when cooled.

**Adhesive Strength of Acraglas when compared to other epoxies:** I was further advised that the components going into Acraglas result in a specially engineered polar adhesive so designed that the individual user without sophisticated measuring devices and precision controls can use it in the home or gunshop with nearly 100% assurance of success. As my information source put it: - "If you put the hardware store junk epoxy, as it is known in the trade, at the very bottom of the scale and the most sophisticated epoxy made at the top of the scale, your Acraglas would be about 2/3rds up that scale. It is as strong an adhesive as can be made and still be used by the average, non-technically trained individual or semi-professional technician with readily available mixing, weighing equipment."

- *Bob B.*



## GOOD NEWS...BAD NEWS

Knowing things in advance is not always the boon to mankind that it's cracked up to be. Take this target shooter we used to know. He was most active but getting along in years and realized that his time on earth was getting shorter. One day while visiting with a priest friend he remarked, "Father, you know how much I love to shoot. Sometime when you are visiting with the People Up There would you find out if there is a shooting range in heaven?" The good Father mulled it over a bit and decided to give it a try. Later in the day he called the shooter. "John, he said, "I've some good news and some bad news. Which do you want first?" Naturally John, the shooter, wanted to hear the good news, so he practically glowed when Father O'Malley proceeded: "It seems there is indeed a shooting range in Heaven, far more elaborate than anything you can imagine. Custom gunsmiths with the finest equipment are at your disposal to make whatever rifle you want and competition is just sharp enough to make it fun forever." To which John replied, "Beautiful, Father. Just out-of-this-world. Now, what's the bad news?" Said the Father, his voice falling and getting a bit shaken, "You have been signed in for the first relay tomorrow morning..."

- Bob B.

## ACRAGLAS GEL® INSTRUCTIONS & TECHNIQUE

### Inletting

Allow 1/32" to 1/16" clearance in barrel channel and behind recoil lug. The wood should be left in rough rather than sanded smoothly - not to increase strength of **ACRAGLAS GEL®** bond-to-wood but to add strength to the wood itself by creating more exposed wood surface and thus realizing the full advantages of the **ACRAGLAS GEL®** strength-giving qualities.

### Metal Preparation - Use Of Release Agent

Shake vigorously or stir before using. Use sufficient Release Agent on all metal surfaces which might come in contact with **ACRAGLAS GEL®**. Apply two coats to insure Release Agent reaches all exposed metal surfaces. **ACRAGLAS GEL®** is a specially formulated, powerful bonding epoxy capable of permanently attaching metal to wood and requiring an axe or chisel to remove! The proper use of **ACRAGLAS®** Release Agent prevents this bonding. **Note:** Fill milled-out sections in metal with putty, modeling clay or plastic wood, smooth with a spatula, cover with waterproof tape and apply Release Agent over tape. Apply **THIN** coat of gun grease, or paste wax, over guard screws after Release Agent dries



on them. When bedding job is completed, Release Agent can be removed from both gun and bedding with warm water. (Release Agent can be thinned with alcohol.) Be certain Release Agent is **Thoroughly Dry** before bedding. Gun and Release Agent must be room temperature or higher.

### **Special Note Regarding Following Instructions:**

Follow measuring instructions closely. The use of additional Hardener will not make your **ACRAGLAS GEL®** accurizing compound set up faster. Too much Hardener will actually cause the mixture to set up improperly or not at all. The instructions are complete and easy to follow. Following them will insure positive and consistent success every time.

### **Mixing And Application**

**Be Sure Wood Is Clean And Oil Free.**

**ACRAGLAS GEL®** need not all be mixed at one time. Mix only quantity needed. Mixing ratio is 1:1 by volume. Weighing components will give incorrect ratio. Use spoon or other measure which can be easily loaded with **ACRAGLAS GEL®** components. (Note: Tablespoon holds 1/2 oz. volume. Teaspoon holds 1/6 oz. volume. One tablespoon equals three teaspoons.) Using clean mixing stick, ladle **ACRAGLAS GEL®** Resin into measure until full, being careful to eliminate voids and large air bubbles. Carefully strike off Resin with mixing stick to give exact full measure. Wipe stick dry with paper towel, and, using the same end, work all the Resin out of your measure into the mixing dish with a careful "peeling" motion. Wipe measure clean with paper towel. Use other end of mixing stick to fill and strike cleaned measure with **ACRAGLAS GEL®** Hardener. Wipe mixing stick clean and use it to work all Hardener out of measure and into mixing dish.

Thoroughly mix (do not wipe) the Resin and Hardener with measuring stick for two (2) minutes, by your watch. At the end of two (2) minutes of mixing, add **Dye** in quantity needed to make **ACRAGLAS GEL®** slightly lighter in color than wood of gunstock. If Atomized Aluminum or Atomized Steel Particles are to be used, you can add up to a ratio of 1:1 at this time. (One part metal to One part **ACRAGLAS GEL®** by volume. For example, if you have used a tablespoon each of Resin and Hardener - total of 2 tablespoons - you can add up to 2 tablespoons of atomized metal.) Mix thoroughly for two (2) more minutes, for a total of four (4) minutes. Always mix a total of **FOUR MINUTES** whether or not you are adding dye or atomized metal. Your **ACRAGLAS GEL®** is now ready.



**Time/Temperature Note:** At 72-75 degrees F., you have approximately 20 minutes working time before your **ACRAGLAS GEL®** becomes too stiff to use and give a suitable bonding between epoxy and wood. At higher room temperatures the stiffening occurs much more rapidly, with proportionate decrease in working time. Working time can be lengthened by setting the mixing dish in a shallow pan of cold water and stirring occasionally.

During wintertime in cold climates be sure your containers of **ACRAGLAS GEL®** Resin and Hardener are at least 68 degrees F. before measuring and mixing. This same minimum temperature must be maintained during hardening as well. In warm or hot operating conditions, chill Resin and Hardener to approximately 76 degrees F. before mixing to prevent too rapid set up.

For accelerated set up of **ACRAGLAS GEL®**, barrel and wood should be heated until they are quite warm to the hand, which will be about 100 - 120 degrees F.

For RAPID setting use heat lamp 12" to 18" away from area where **ACRAGLAS GEL®** has been applied. NOTE: Remember - adding "extra" Hardener PREVENTS complete hardening.



### **Bedding**

With mixing stick, spread the prepared **ACRAGLAS GEL®** in a ridge down the center of the barrel channel to prevent air being trapped when barrel is set. Also fill recoil lug recess sufficiently to completely fill recess when fitted. A very thin coat should also be spread around interior of complete action recess. Firmly press barrel and action to desired depth. You may find you will prefer bedding recoil lug and other gaps between receiver and wood first (see Duplex Bedding technique below) and then, when thoroughly cured, applying **ACRAGLAS GEL®** to barrel channel and balance of receiver area.

When **ACRAGLAS GEL®** shows signs of taking a firm set - generally 5 to 6 hours after application - remove surplus exposed **ACRAGLAS GEL®** with a dull knife or spatula. Wetting the knife or spatula with saliva will speed up work and keep instrument much cleaner. In 12 to 18 hours (next day) **ACRAGLAS GEL®** can be trimmed beautifully with sharp knife or wood-working chisel. Be careful not to scratch gun bluing! Leave a very small bead of **ACRAGLAS GEL®** above wood between stock and metal to be sanded to contours of stock after final curing. Small traces of epoxy adhering to barrel, action, cutting instruments and hands can be removed while still tacky by rubbing with a vinegar saturated cloth.

Under normal conditions gun can be removed from stock with-



in 6 to 8 hours. In cases of extremely tight fit, the careful use of a soft rubber mallet will help get gun and stock apart. Should you find voids (bubbles or the like) between metal and **ACRAGLAS GEL®** these can be filled by applying fresh mixed **ACRAGLAS GEL®** in minute quantities and re-bedding barrel and action. Bonding will be complete and as strong as if void had not existed. Be sure voids are completely free of Release Agent before filling; and, you must re-coat the metal with Release Agent.

You have now given your gun the finest of accurizing jobs. It can be fired in three days, but waiting a week will be much, much better.

### Duplex Bedding Technique

First bed the recoil and other points of high recoil impact with **ACRAGLAS GEL®** containing either Atomized Aluminum or Atomized Steel Particles; then bed the balance of the gun using straight **ACRAGLAS GEL®** with walnut dye. This gives the strongest possible internal bedding job with the greatest exterior eye-appeal to the finished gun.

### MORE ABOUT YOUR

**ACRAGLAS GEL®** is acidproof, waterproof and weatherproof. Pound for pound stronger than steel, it will never rot or deteriorate, resists alkalies and has superior insulating qualities. It is highly resistant to impact and will not dent; should it ever be damaged or if an improper job is done the first time, it can easily be corrected or mended by using more materials from the kit. Sanding can be done by hand or machine, using open grit and slow speed - less than 1600 R.P.M. Bright finish can be obtained by buffing with a linseed-oil-soaked cloth polishing wheel following sanding.

Unlike paints or air drying plastics, **ACRAGLAS GEL®** bedding hardens by chemical action, so a hard surface indicates a hard interior ready for finishing. The mixture becomes hot before reaching setting temperature - it then kicks over and begins to harden, reaching full hardness after 28 to 60 hours.

**ACRAGLAS GEL®** is ideal for repairing split or broken gun stocks. Its highly sophisticated formula bonds split wood samples so tightly we have never succeeded in re-breaking a joint repaired with **ACRAGLAS GEL®**!

Store in cool place. Shelf life of unmixed **ACRAGLAS GEL®** components is Seven to Ten Years.

- *The Crew at Brownells*

### JUST THE FINISHING TOUCHES...

I do a bit of stock work from time to time and it seems one



fellow in particular has been most complimentary about some of my own guns and my work for others. Soooo, he wanted me to give him the 'formula', you know  $B^2-2ac/3$  equals 1-Gunstock. Well, I spent several hours with the fellow and his boy - answered 145 questions, showed them sketches, hand designs, work in progress and all the books. They were most enthusiastic when they left. Around a week ago, after about three months absence, my contemporary stopped by to say his boy had turned out the most beautiful stock for a '98 you should be lucky enough to see, checkering, recoil pad and all. Ding, but he was proud of the kid! 'Almost has it done - just the finishing touches,' he said. "Sling swivels?" I asked. "No," he says, "just the inletting..." (Ed adds: Some folks listen and some folks hear!)

- Ed Buckland, Del Mar, California

### 3-POINT ACragLAS BEDDING

I do quite a lot of glass bedding and I have not yet heard of anyone doing a job like I do mine. First of all, I do not use anything but Acraglas and I mix it according to your instructions.

The first step is to inlet the barreled action to a 3-point bedding, that is having equal pressure at the front of the forend, behind the recoil lug (front screw) and at the rear of the action, (back screw). Try not to open up the top of the stock too much which will show a lot of glass on a completed job. (I had one job in here that had been put on a table saw to get it inletted and needless to say, there was a lot of glass showing when I finally got it inletted and glassed.) Now, using a small chisel or Dremel tool, gouge out some wood leaving the 3-points of your bedding, and stay away from the top edges and magazine cavity. Coat the trigger guard with release agent and let dry. Put the trigger guard in the stock and stuff paper towels from the top side into the magazine cavity and trigger cavity until nearly to the top. Then fill the rest of the way with brown "magic clay". I also fill the action with paper towels and the clay, and try the barreled action (with the trigger off) into the stock to make sure everything is okay. Be very careful on how you use the clay as this will show up in the neatness of the completed job.

Plug all guard screw holes with the clay to keep the glass from running through, but use only a small amount in the front guard screw hole because you will have to poke the screw through it to tighten the action in the stock once the glass has been poured in. Before proceeding, coat the barreled action with release agent and let dry.



After you have poured the Acraglas into the stock, put the barreled action in and pull it down with the front guard screws, making sure that the front guard screw is short enough not to bottom out on whatever amount of magic clay you have plugged the guard screw holes with. I have also used a C-clamp to pull the action down when I've had a screw bottom out, but do not like to do this unless absolutely necessary.

When the glass hardens enough to keep from sticking to the action, fingers, or whatever, but is still pliable, take one of the mixing sticks and sharpen one end like a chisel. Then proceed to scrape off any excess glass around the action and barrel.

Now, wait until the glass has hardened sufficiently to keep from damaging it too much. But while it is still soft enough that you could dent it fairly easy with your fingernail, remove the barreled action from the stock. Clean up the barreled action and stock of the magic clay and release agent. Trim edges of Acraglas, cut out whatever glass is covering the magazine cavity and trigger cavity. Do this carefully so as not to damage the bedding left in the stock. Then clean out the front and bottom of the recoil lug recess of a small amount of glass.

While the Acraglas is curing completely, clean up the barreled action and install the trigger back on the action and lubricate everything lightly with a good coating of oil. Now you can reassemble the gun and stock but tighten the front screw only and run the back on in until it touches. Do not tighten this back screw, as I have seen some bedding jobs where the back of the action, especially on Mausers and Springfields, can pull down as much as 1/16" and this is only springing the action.

After reassembly, put the gun away for a couple of days and you will have a glass job that is absolutely glass-to-metal fit.

- *Bob Cassetty, Hendersonville, Tennessee*

## **JEWELERS ROUGE STOCK INLETING MEDIUM**

When inletting a stock try red jewelers rouge on a felt pad mixed with some medium weight oil. Rub the felt pad impregnated with the oil on the stick of red rouge until you have a good coating of the stuff on the felt. Then, pat (don't rub) on all the metal surfaces and go to work. The rouge will wipe off the metal with any solvent and off your hands with soap and water. I've used this method for some 15 years and it has always worked very well for me with a minimum of staining.

- *Murray Ruffini, Milford, Maine*

## **LIP-SMACKING TIGHT**

I noticed various inletting substances in your **Kinks I** book and

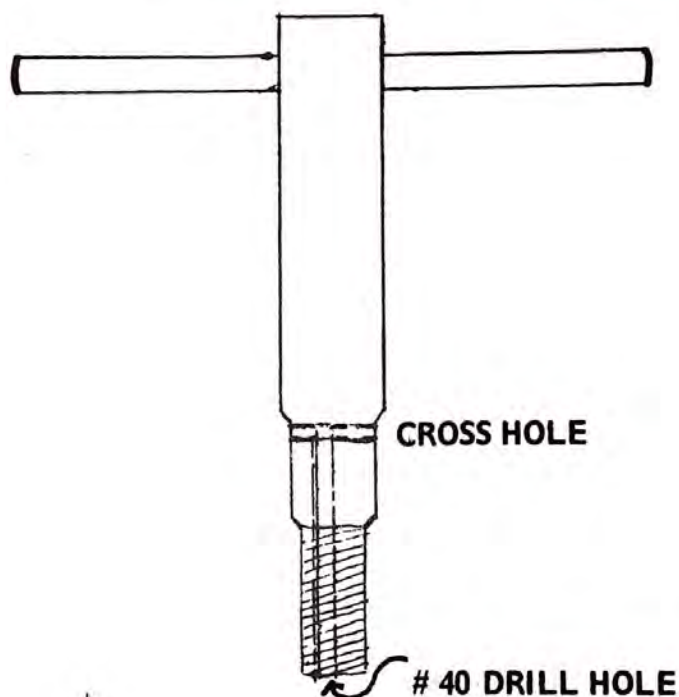


other gunsmithing books include: cold cream, hi-spot blue, orange, Crisco, etc, etc. It took me 25 years to discover the best, handiest, cheapest, and most readily available... Lip-stick. After a honeymoon at age 50, I now only use my wife's discarded lip-sticks. The darker the shade the better.

- *Markell Retzer, New Brighton, Pennsylvania*

### STOCKMAKER'S HAND SCREW DRAIN

When glass bedding rifles with a blind trigger guard screw hole such as in recoil lugs of bolt action rifles and tang of Springfield '03, a problem is encountered with the epoxy getting into the screw hole preventing the stockmaker's hand screw from pulling



the action and trigger guard up correctly. There is no practical way of preventing the epoxy from getting into the screw hole, so apply your release agent and don't worry about it. Using a #40 drill (or thereabouts), drill a hole up the shank of the stockmaker's hand screw to a point past where the shoulder enters the trigger guard. Then drill a hole across the shoulder intersecting the hole up the shank. When ready to bed your rifle, fill the hole with a paste wax (thin ?) and presto, when the screw is tightened into the receiver, the epoxy flows through the hole. A simple matter to clean the passage with a drill later.

- *Bill Choate, Palmdale, California*

### ACRAGLASING TRIGGER GUARDS

I've often wondered how many of the gunsmiths who Acraglas



bed their rifles, also bed the trigger guards too. If you don't bed under the trigger guard, every time you tighten up the guard screws you can be subjecting the stock to undue - and unnecessary - pressure, especially if the wood is slightly soft. Simply by bedding the area under the guard screws and the trigger guard you prevent any compression of the wood, and keep the action in a perfect-fitting mold of glass bedding. Remember the next time you do a stock job, bed the trigger guard and help just that much more to keep that "perfect" point of impact.

- *Maurice Jurena, Brenham, Texas*

### **SAVING THE FINISH WHEN BEDDING A RIFLE**

When glassing a new rifle, a drop of 'glass on the new finish - no matter what kind - may spot the finish. I never have that problem. It only takes a half hour or less to cover the complete stock with masking tape plus butcher paper in the wide rear stock areas. Just let the 'glass roll on over the paper. Then when new 'glass is putty consistency, carefully cut the "joint line" with your shaped scraper to have a clean edge line. When the job is completely done, the overruns all come off with the tape and the paper. And, if you had Acraglas on your hands and the stock had slipped, you would have grabbed it, regardless of what you had on your hands. All wrapped nice and purty this way, it doesn't matter where you grab the son-of-a-buck!

- *Carl Maurer, Cuyahoga Falls, Ohio*

### **A FORGIVING MAN**

An old trap shooter in a town south of Montezuma went to see his undertaker to make plans for his funeral before his death. When it came to the pallbearers he named off six. The undertaker was quite surprised at this. "John," he says, "these guys were your worst enemies on the trap field. How come them?" "Yeah, I know" says John, "but I want the world to know that I am a real forgiving Christian and can do things like that." The undertaker beams for such a fine man. "And" he says, "this 500 pounds of shot that you want in your casket is in memory of a lifetime of shooting?" "God no!" says John. "I want to give those sons-a-bitches hernias!"

- *Bob B.*

### **GLASS-IN AN ALUMINUM ROD FOR SUPER-STRENGTH BEDDING**

I glass an action top and bottom, in such a way that no metal touches the wood anywhere, yet the glass does not show along the



edges on the inletting. I wrap enough tape around the barrel from the action to the muzzle so that a dollar bill can pass freely from the end of the chamber through the forend tip when the glass is set. In the forend area, I undercut below the halfway mark of the barrel to let the glass flow under the edge of the wood. This forms a lock, plus reinforces the wood to prevent warpage. I also tape the top edge of the barrel channel to catch the run-over of the Acraglas.

Next, using my router, I let the cutter down just short of the forend tip and make a shallow cut about 1/2" from the end of the tip. Then I move back and continue dropping the cutter until the central groove I am cutting runs all the way back to the action. When done routing, I clean everything up with a 1/4" round-ended chisel so that I have a round-bottomed channel about 1/2" wide and 1/2" deep from action to about 1/2" from front end of forend tip. Taking a 1/4" aluminum rod, I cut it to length, drop into the channel to check that nothing touches the barrel or front action, then Acraglas it into place.

Normally, takes about 3-oz. of Acraglas; I also add in floc to thicken nicely, and stir a lot.

In order to get the rod to "float" between top and bottom of the groove, I place an amount of the juiced floc in the barrel channel groove to fill it about half-way up. Then I place the rod on to this and cover the rest of the way and seat the barrel and action in the usual manner. Normally this takes about 3-oz. of Acraglas to which I add a fair amount of floc and stir the daylights out of.

My customers like the system a lot, and have gotten very good results with this bedding technique.

- Carl Maurer, Cuyahoga Falls, Ohio

## DAM THE 'GLAS

My usual method of stopping Acraglas from running into unwanted places is to use modeling clay or "crazy putty" in the barrel channel, trigger hole, receiver sidewalls, etc. This "tinkerer's dam" material forms easily to both action and barrel. If the barreled action is oiled and placed into the stock, and tightened easily, it then can be removed and the dam material will still be left in the stock. Then, by using a knife, you can trim the tinker's dam to the exact stop points and contours wanted.

Now coat the barreled action with release agent, place the Acraglas in the center of the cavity and reinsert the barreled action, with the coated stock screws and let set.

An alternate method involves using plastic wood where putty and clay are scarce or refuse to adhere to the wood for some



reason. In this case, care must be used to be sure the barrel and action are slick, but not dripping in oil, prior to molding the dam (plastic wood) which can be easily cut and shaped when fresh.

Secondly, the glass should be applied, and the coated barreled action screwed in place immediately after trimming and molding. This will allow the bedding to set enough to remove the barreled action and scrape out the still-soft plastic wood dams.

- *Harris Foster, Corpus Christi, Texas*

## PREVENTING BEDDING FROM RUNNING

If you need to build up a place with Acraglas and it runs into where you don't want it, try making a dam with candle wax. You can drip it into about any place, and cut or form it just like you want, then when the Acraglas is hard and barrel/action removed, just cut and scrape the wax away. (A GREAT idea . . . Bob B.).

- *Fred's Gun Shop, Mobile, Alabama*

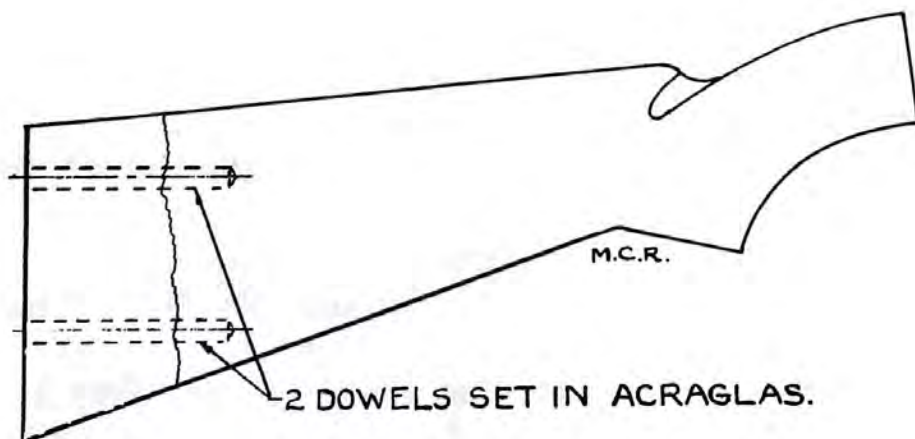
## PLASTIC WRAP THE SIDE PLATES

I have picked up a few tips on repairing guns with side actions. In muzzle loaders, instead of packing the works with clay, I use some of this plastic sandwich wrap. I put the Acraglas in the broken stock, then cover the side plate and works with plastic wrap and press it in. When it hardens, I just peel out the sandwich wrap and there is a minimum of clean-up to do. I sometimes coat the plastic with Vaseline to insure release. This method can be applied to barrels, grips and all other parts you wish to protect when bedding or repairing. (The possibilities of Roger's method are limitless, as anyone who works with epoxies will readily note! . . . Bob B.)

- *Roger Landry, Vuxbridge, Massachusetts*

## ACRAGLAS JOINT FOR LENGTHENING STOCK

While bedding a rifle with Acraglas - love the stuff - I remembered that I also had to lengthen a shotgun stock. I found a piece





of wood that came fairly close to the grain and color of the stock, roughed up the ends on both pieces and slapped them together with some remaining Acraglas.

When I finally got around to checking the bond, several days later, I found that there was no need to reinforce the extension as I thought would be necessary. The stock was just finished off, and the customer was very happy. (Note: Even though this job worked out fine, we would recommend at least two dowels be put through the extension and into the existing butt stock for some additional strength. Of course, use some Acraglas to hold the dowels in place. . . Bob B.)

- Robert Wetzel, Granite City, Illinois

## IMPROVING THE FLOCK?

The young ecologist and S.P.C.A. gal was giving a talk to sheep herders about the evils of poisoning coyotes. "You can, you know," says she, "cure the coyote problem much easier and more kindly by just capturing the animals and making them neuter." To this she added a great deal of aesthetic detail. Unable to stand it any longer, an old rancher rose and asked for the floor. Said he, "I must take exception to this young lady's remarks. She does not understand what we are doing. We want to kill coyotes, not stop them from breeding our ewes!"

- Bob B.

## FILING ACRAGLAS

Was mending a stock with Acraglas and it did a beautiful job. But, it oozed out where the joint was made and set up. I tried sanding, gouges, and a knife—but not much use. Then I tried a file! Worked like a charm. Have even repaired breaks and cracks in stocks since then, and with careful filing I did not have to refinish the stock.

- James Davis, Eastanollee, Georgia

## SPLIT STOCK REPAIR

Here is something much better for repairing split stocks, etc., than strips of inner-tubing. . . 3/8" or 1/2" surgical tubing. It will stretch and stretch and stretch. Use it for attaching forend tips, grip caps, cracked and split stocks. (Also makes a better belt than Pappy Kakam's Rope.) When using Acraglas, I have repaired stocks split from end to end. I've been using the same 5 ft. length for 8 years. It will stick to Acraglas, but pulls right off with no damage to tubing. When repairing split stocks, best to coat stock with Johnson paste wax unless the stock is to be refinished.

- Bill Choate, Palmdale, California



## BLACK ACRAGLAS

I have found that some bone black mixed with Acraglas works great to repair buttplates and forend tips.

- *Bryan Burgin, Sidney Center, New York*

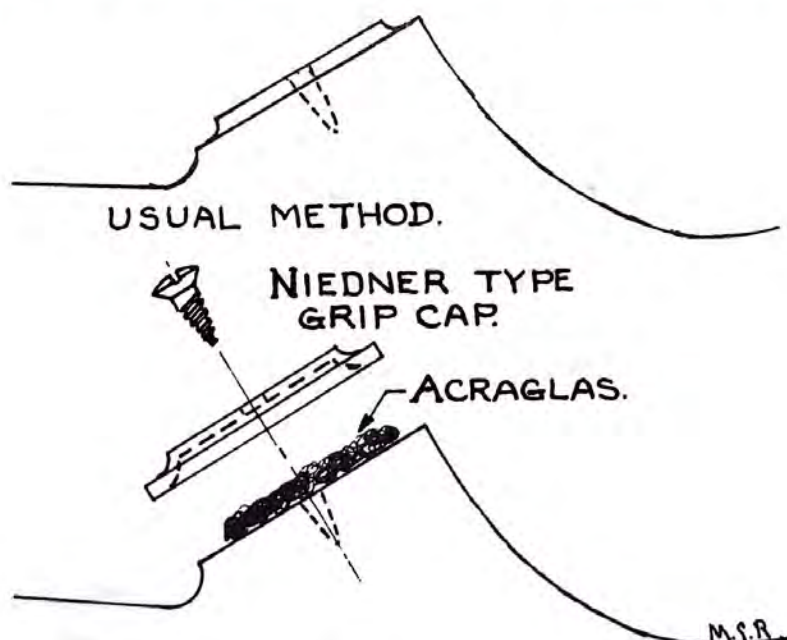
## ACRAGLAS STAIN

Have used Acraglas exclusively since it was placed on the market and before the dye came in the kit, I used oil based walnut stain. This is very easily used and color control is excellent. I thought possibly there might be a long range change in bedding due to oil stain, so I discontinued oil stain when dye was supplied with the kits. Have checked thoroughly on some of the old jobs and after 15-20 years (!! ) find no change in hardness in recoil lug area . . . nor any other change caused by oil stain. (Note from Bob B. - this might be valuable information if the dye that comes with your kits is hard. We are going to a sealed, plastic envelope for the dye to stop this hardening in the vial bit . . . but sure a lot of kits out with the old dye containers.)

- *Harrison Snyder, Huntingdon, Pennsylvania*

## ACRAGLASING ON NEIDNER GRIP CAP

Rather than having to fully inlet the Neidner style pistol grip cap into the end of the pistol grip, try some Acraglas the next



time you have to install one. I just flatten the grip bottom perfectly and then add a glob of Acraglas between it and the cap that you screw in place. Just make sure that you use release agent on both the grip cap and the screw.

- *Will Fowler, Anchorage, Alaska*



## **VIBRATE OUT THOSE ACRAGLAS BUBBLES**

Wanted to add my two cents worth on how to get rid of the dang bubbles in Acraglas. If you have a grinder like one of mine that vibrates a little, just set the cup on it for a minute and all the bubbles come right to the top and out. Then pour carefully and you won't put any back in. My grinder has a flat top to make it easy, but I am sure any holder could be fashioned for others if necessary.

*- Dennis Bell, Atwood, Kansas*

## **VIBRATING OUT ACRAGLAS BUBBLES**

Between the real thin mixture of Acraglas I use and a little trick I came up with on the last couple of glass jobs, I don't know what an air bubble is. Here it is: Support the rifle to be bedded with the butt-end supported and clamped like an overactive bench rest rear support, and the forend with the barrel level and supported by a vibrating tool of some kind. I have a small straight-line finish sander that buzzes the living daylights out of the stock. Run the tool only as long as the bubbles are working their way out of the glass. They really come popping out! I've gotten a couple of really good accuracy beds out of the above method, but you do have to be on your toes while doing it, or the glass will vibrate itself right out. This same idea should work beautifully when casting inlays or filling damaged places in stocks or even gluing together broken stocks to get ALL the bubbles out and give you a perfectly smooth surface that can be worked down flush with the surrounding wood without any air-bubble voids complicating the job for you.

*- Larry Edwards, Letcher, South Dakota*

## **FILTERING OUT AIR BUBBLES IN ACRAGLAS**

I did a little experimenting on my own gun and found that if you get a piece of loosely woven material and strain the Acraglas through it, your troubles are over. Proceed as follows: 1) Mix as instructed without floc. 2) Take material and make a funnel shape out of it in a cup. 3) Pour Acraglas into cup through material, being sure cup is tilted in one direction so contents will flow down the side of the cup after it passes through the material. 4) Use an ice cream stick and slowly push Acraglas through the material and DON'T HURRY. Note, I'm enclosing a piece of the material I used. (Note, BB - Material looks like some sort of lint-free synthetic with a thread count of 40x80 or thereabouts. Really, this is a pretty clever idea for taking out those @\$%&\* bubbles. . .)

*- Steven Brown, Mt. Airy, Maryland*



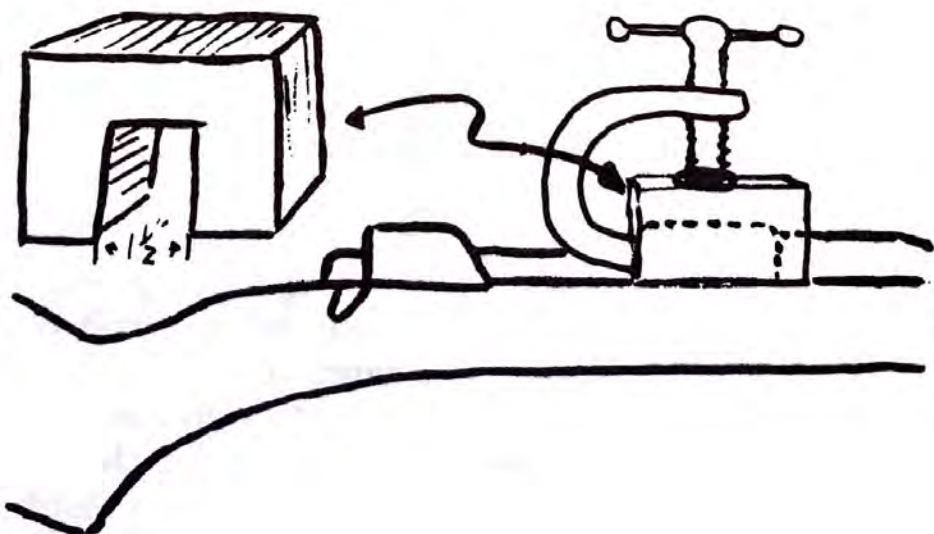
## TRAVELING COMPANION - A REAL CHANCE HERE

"Dear Mr. Brownell - Perhaps you have heard of me and my National Crusade in the cause of Temperance. . . Each year for the past fifteen, I have made a tour of the states of Alabama, Florida, Georgia, Mississippi, Texas and Kentucky delivering a series of lectures upon the evils of drink. . . On these tours, I have been accompanied by my friend and assistant, Albert Franklin. Albert was a pathetic case. A young man of good family and excellent background, but whose life had been ruined because of the excessive indulgence in Whiskey, Gin, Vodka and Beer. Through the later years of his life he was almost constantly found to be inebriated. How much better it would have been had he turned to Temperance instead! . . . Poor Albert would appear with me at lectures and sit on the platform slack-jawed, drooling at the mouth and staring at the audience through blurry, bloodshot eyes. At other times he would just sit with his eyes rolled back in his head and mumble to himself. I would then point him out as an example of what drinking would do to the body and soul. . . Unfortunately, Poor Albert died this past winter. A mutual friend has given me your name, thinking that perhaps some of your gunsmith friends would like to accompany me and take poor old Albert's place. Yours in faith. Mike Noble, Noble's Gun House, Houston, Texas" (Some of the guys I've shown this to are thinking seriously about this job!!! No pay, of course - just honor. Bob B.)

- Mike Noble, Houston, Texas

## FREEING GLASS BEDDED ACTIONS

We have had trouble freeing an action or barrelled action when



glass bedding. This is a simple way of freeing an action or barrelled action without too much danger of breaking anything or creating

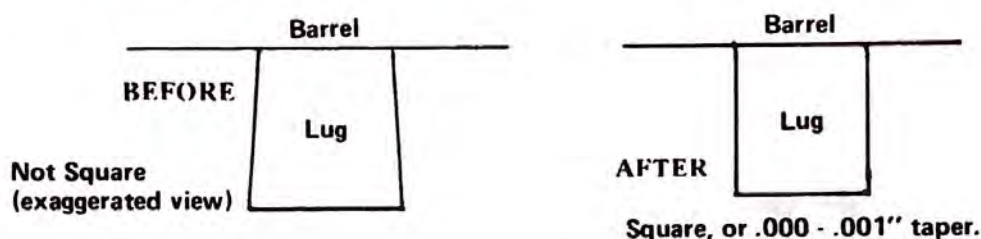


hammer mars. Make a hardwood block like shown upper left with the opening just wide enough to clear the receiver ring. Place a small aluminum "C" clamp over the block and inside the receiver as shown, protecting inside of receiver with a leather pad. Gently *tighten the "C" clamp and tap the barrel at the forend on a padded post of your bench*. Comes right out if you didn't forget to use release agent. Little harder if you forgot. Ha!!

*-Jean Imbert, San Carlos, California*

## SQUARING UP THE RECOIL LUG

While bedding a particularly uncooperative Model 70, I decided to check the squareness of the recoil lug because it just didn't look right. It was really out of square - and varied in thickness too - so I guess it wasn't any wonder that when it came time to



separate the barrel from the stock, it looked like it was going to take a Mack truck before it came "unlocked". Next one I did with the same problem I reshaped the recoil lug just enough to bring back to square, put on a slight taper, polished it bright with Simichrome and then blued it. Bedded beautifully, came out of the wood like a dream. I've used the same technique several times since then, particularly on rough-milled actions, and never had a hang-up!

*- Verne Dow, Topeka, Kansas*

## ACRAGLAS - AND THOSE DEEP PITS

I have found that when glass bedding some of the old military rifles that some of them have pretty darn good pits on the underside of the receiver and the barrel. And, when the Acraglas is cured, you'll find that it has gone into these pits (like it is supposed to), but to take the gun out of the stock, you'll swear you didn't put any release agent on the metal. After tapping, cursing and sweating, worry and fear, get a 3-foot length of rubber tubing and: (1) take the gun over to mother's sink, (2) put one end of the tube on the hot water faucet, (3) put the other end of the tube into the chamber end of the receiver, and (4) turn on the hot water till it is good and hot (steamy-boiling water out of a kettle will work too) and run this hot water down and out the muzzle of the rifle. The



heat of the water will transfer to the metal and you can tap the action out slicker than an overdose of Fenamint. The water has to be pretty hot, but it doesn't hurt anything. I usually wait for the metal to get "ouch" to the touch.

(This probably explains better than anything we have ever run into just why the barrels/actions might have stuck in the first place - and how to get them out easily with no damage to gun, wood or bedding. So - save this one and keep it handy - like taped above your shaving mirror - 'cause sometime it is going to save your life when a 'glassed gun sticks on you. You'll know immediately what to do to get it free! Bob B.)

*- Dan Wedele, Fremont, Nebraska*

### **"PAM" EMERGENCY RELEASE AGENT**

While doing an important Acraglas bedding job, I ran out of release agent. In desperation tried some of the wife's PAM; worked like a charm. (Note from Bob B. This has been one sent in by many, many of you, but I think this might have been the first one.)

*- Jim Blake, Seattle, Washington*

### **OTHER GLASS BEDDING RELEASE AGENTS**

You may already know about Casey's Gun Stock Wax being an awfully good release agent when glass bedding, because it really leaves the glass nice and very smooth. Nice part about it is that it lets loose easily too. But, did you know that you could wax the parts with a good carnuba-based wax such as Trewax, Bruce's, Johnson's, etc, and get excellent results too. Do not buff the parts before glassing; just give the wax a chance to "set-up".

*- Greg's Custom Guns, Phoenix Arizona*

*- Russell Johnson, Clay City, Indiana*

### **LOUDLY AND WITH AUTHORITY**

The old "saw" about saying loudly and with authority is important, too! M. C. Ray, whose kinks and drawings you've seen in all our stuff for 30 years, has a married daughter who is a grand gal, a real lady and a jewel - and they have a little granddaughter who's the cutest little honeybun you ever saw. Her name's Janis and for her Fourth Birthday (I believe) they got her a beagle and told her she could name it, so she called it "Bigle" (after her pappy's name, Bigler). When she asked her dad why Bigle obeyed him but not mother, Bill told her she must speak firmly and with authority to him so he would know that she meant it. She called "Bigle" and he paid no attention. She tried "BIGLE!!" and he



looked at her and walked away. Then she shouted "BIGLE! Get your ass in here!" And she has been his master ever since. (At last word, Mama is still in deep shock!!)

- *Bob B.*

### **QUICK FREEZE TO FREE ACraglased-IN BARRELS**

A friend of mine had a barrel stuck in the stock during an Acraglasing job so bad that he didn't know if he would ever get it apart. After everything else he tried failed, he took all the frozen food out of his upright freezer and put the whole thing inside overnight. The next day the thing came apart with only a small tap with a brass hammer. (Super info, this, so be sure to squirrel it away for use in case you ever have a similar problem. Bob B.)

- *Mike Moore, Guilderland, New York*

### **WHEN YOU DIDN'T GET ON ENOUGH RELEASE AGENT TRY THIS ONE!**

My work is mainly restocking and I always use Acraglas and let the stocks set up at least 24 hours before removing the metal from the wood. Altho I use plenty of Release Agent I still sometimes have quite a wrestle removing the action. I used to stick an electric soldering iron as far into the chamber as I could and warm it up, but that takes so durned long. So, last time it happened I went out to the garage and brought in my dip-stick oil heater. I didn't know how hot it got as I had never plugged it in except in the crankcase. But, boy, does it ever get hot for about 3 inches on the top. Just remove the bolt and insert the heater into the chamber, keeping your fingers on the action to tell when it gets hot. Just takes a couple of seconds before the action gets warm and lifts out really easily!

- *Jim Campbell, Mesa, Colorado*

### **ACragLAS CHEEK PIECE**

I found Acraglas to be a nice way to make a temporary cheek piece or to raise the comb height for shotguns.

Here's how to do it:

1. Smooth tinfoil carefully over the butt stock and tape it down.
2. Cut pieces of fiberglass cloth to desired shape, using a roll-over type cheek piece design.
3. Place cloth in position and paint with Acraglas. Build up as many layers as necessary for desired comb height. Floc can be added and also color as needed.



4. When dry, remove from stock, peel off tinfoil and sand edges.
5. Take 2" wide carpet tape, which has adhesive on both sides and press on inside of cheek piece. Peel off outer adhesive cover and place cheek piece on stock.

This can be used all season, will not harm the finish, and can be removed when you want it off.

- *Harland Doering, Milwaukee, Wisconsin*

### CURE FOR BED WETTING...

Or, "Look what I did with my Acraglas this time." I sat down on my waterbed with a screwdriver in my rear pocket. In any event, I tried several things to stem the tide, none of which lasted more than about 2 months, and then it was back to the wet-bed-in-the-morning problem. Once, while putting some Acraglas (with Brownell's Black-Stuff in it) on a stock, I had some left over, so quick-like-a-rabbit, I whipped off the sheets/blankets and before the stuff set up (it was getting mighty hot in the cup by this time), I smeared it all over and around the hole. The repair was an unquestioned success. It is still secure and the coloring given it by the Brownell's Black-Stuff let me see where I was getting it. Now I think I will offer a new service to my customers: Bed Bedding!! (PS: Can be done without draining the bed. Should be applied just before the Acraglas sets up and the use of a patch for large holes helps if the tear/hole is big. Point is, Acraglas does not seem to be affected by seepage of water during the curing process.)

- *Jim Bianchi, Glendora, California*

### SHOTGUN "BALANCING"

When a FUSSY shotgunner comes in with a shotgun that is 'too light in the butt' for the balance that he wishes, we bore out a hole in the butt - stuff shotgun shot into it with a wad of cotton to hold it. Stuff it in until you get the balance that he wants. We then pour out the shot, mix a small batch of Acraglas, mix the shot into the glass and stuff this mixture into the hole in the butt stock. If the mess is too light, we add more. If it is too heavy, we drill out until the right amount for correct balance is left. (Note from B.B. You've probably already guessed what I'm going to say: Just be sure to drill a new hole, don't use the stock bolt hole on a two-piece stock...)

- *Maurer Arms, Cuyahoga Falls, Ohio*



## **"'GLAS DOLL"**

The staff at Happydale Doll Hospital are wild about Acraglas for gluing and patching dolls heads, hands, and feet. For background and missing pieces; sawdust, chalk, whiting, insulation, and fiberglass has been mixed with it and the results are wonderful.

This being the age of "transplants," it seems we now have one from the gun repair to the doll repair field.

*- Elmer Steidinger, Westmont, Illinois*

## **INSTALLING RECOIL PADS**

This is probably the most written about subject in gunsmithing, but I still see far too many butchered recoil pad jobs. I won't say anything about the grinding and cutting of pads, because I don't know any easy way, just patience and careful work. However, installing them on the stock is another story, and here is how I do it.

**Stocks without through-bolt:** Trace the outline of the buttstock on the bottom of the recoil pad. Before attaching the pad to the stock, roughly grind or remove as much of the excess rubber from the pad as possible, being sure to allow for the toe and heel extension into the finished pad line. Throw away the screws, and install using Acraglas as an adhesive. I use my checkering cradle as a long clamp. After the Acraglas has set-up, finish the pad off as you normally do. I get excellent results everytime, no marred pads and have never had one come loose. This method even compensates for a less than perfect job of cutting off a stock, if that ever happens!

**Stocks with through-bolts:** Use common vaseline for lubricant on tools which make contact with screw hole through the pad. Use a lubed heavy needle to mark the hole locations in the recoil pad, and then slit them open with a lubed knife. Make the slits vertical 1/2" to 5/8" long. I found the long slits don't chafe under the screwdriver as bad and I use a thin Exacto knife to make my cuts. If you need to, grind a special screwdriver blade to fit the recoil pad screws. Polish and round off all corner and edges on the screwdriver and you won't be able to find the holes without compressing the rubber!

If you want a super invisible job, clean the rubber around the holes with lighter fluid and put a small amount of clear silicone sealant in each hole. This will bond the rubber and the only trouble you will have is if you have to ever take off the pad, you can't find the holes!

*- John Lovallo, Lynchburg, Virginia*



## RECOIL PADS - INSTALL'M FASTER THAN YOU CAN READ THIS PARAGRAPH!

You'll need a bench saw with a sharp, fine tooth blade, a roll of 3/4" cellophane tape, a felt polishing wheel with #140 Polish-O-Ray, and a muslin wheel with #400 Polish-O-Ray. Tape the butt securely with two layers of tape at the place you make the cut. Cut fast so as not to burn things more than necessary. Remove the tape by slowly pulling straight back, *do not pull up*. Apply two new layers of tape, the bottom one barely protruding over the edge and the top layer back from the edge about 1/8". With a fine rasp, trim the protruding layer which also removes any feather from the saw cut. Now drill and plug the old screw holes with 1/4" dowels as it just isn't worth the effort to fit the pad to the existing holes. Position, drill, and fasten the new pad to the stock.

When attaching a recoil pad in which the holes are not punched all the way through the pad, I finish punching the hole with an awl. Then I coat the screw and my special screwdriver (one that I have ground the blade to the same diameter as the shank) with Crisco. Also place a drop of the Crisco at the spot where the hole is and push the screw through. Insert the screwdriver and tighten up the screw. Man, when you remove the screwdriver and wipe the Crisco off the back of the pad, you simply cannot see where the hole is. This sure makes the customers happy. The pad looks like it is glued on.

Now with a fresh coat of #140, dress down the pad with the felt wheel. This really cuts the rubber. With the light and accurate touch of the wheel developed by the polishing of many guns for bluing you can shape and contour the pad perfectly. Stop when you barely touch the tape as hitting it too hard creates heat which melts the finish and is the cause for most tape users removing the finish from this area. HEAT is the enemy. A fast pass with the muslin and #400 will finish the job.

- Francis Green, Cheyenne, Wyoming

## A HEART-WARMING STORY...

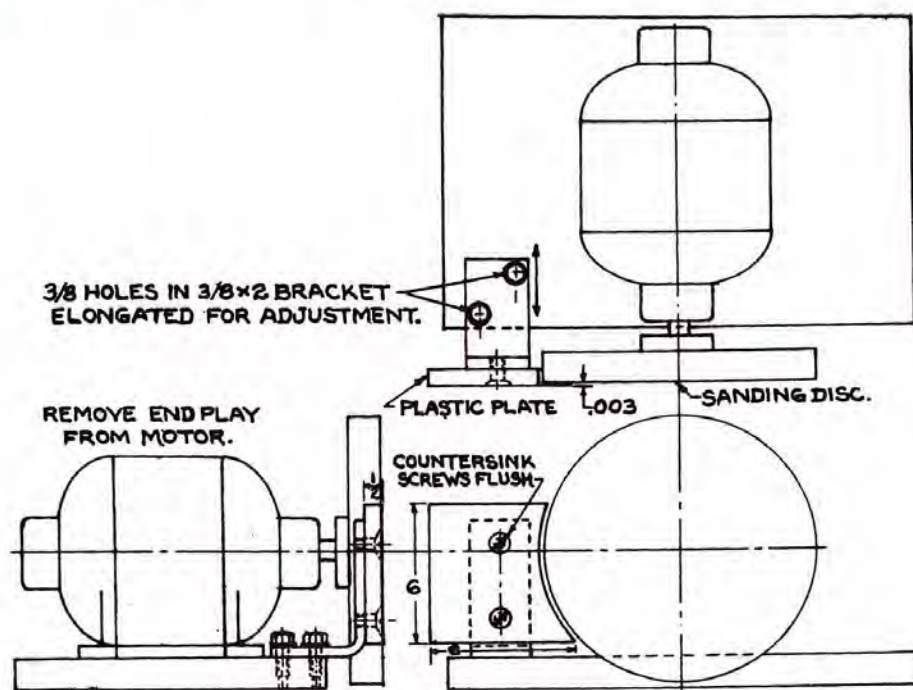
About the young boy who was born in the city slums of poverty stricken parents. He grew up through trials and tribulations and eventually married a neighborhood girl and they had several children. For years he struggled and saved and scrimped and finally invested in oil wells which struck it rich in a big way. He soon had a home in Palm Springs, and a villa on the Riviera. But he never forgot. Every year about Christmas time he goes back to the old neighborhood... and visits his wife and children.

- M. C. Ray, Cleveland, Ohio



## RECOIL PAD DISC SANDER

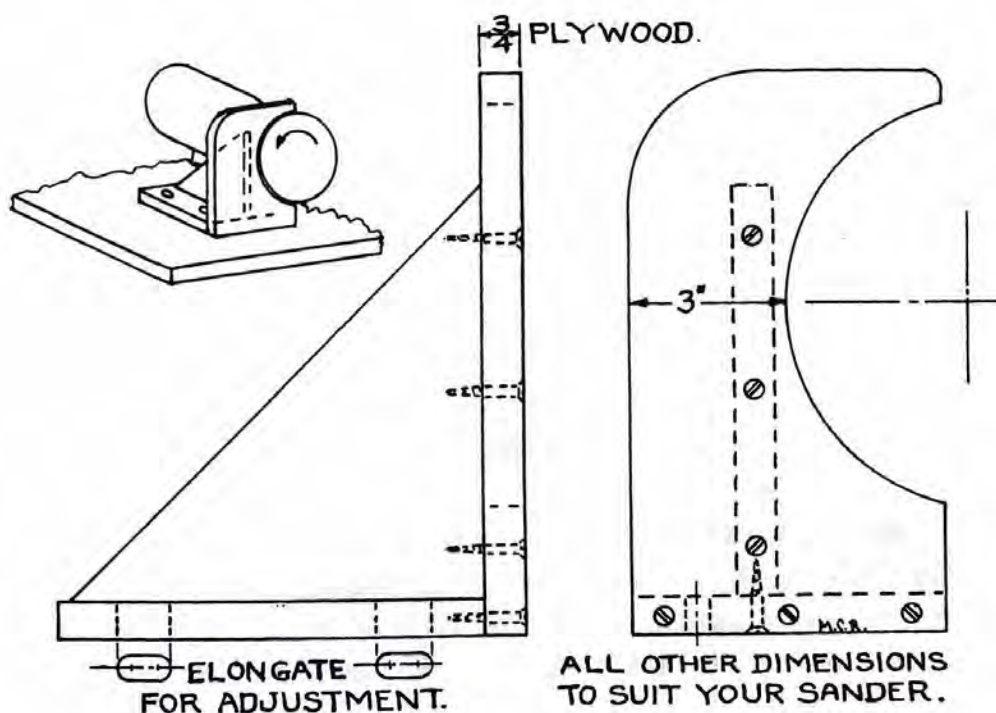
I had to put a new recoil pad on a shotgun and, of course,



without hitting the finish on a fine over and under. So I came up with this fixture for my disc sander. It will work just fine as long as you do not have any end play in your sander disc.

- Robert Robb, Sr., Fort Pierce, Florida

## RECOIL PAD DISC SANDER GUIDE





I made mine from a 3/4" thick piece of plywood, as shown in the enclosed drawing. The plywood should be at least 3" wide at the center of the sanding disc, and the side mounted closest to the disc should be cut-out so that the diameter of the disc just misses when turning.

In use, adjust the guide to be parallel and slightly away from the disc. Install pad on stock (best to have all hardware removed for easier handling) and tape the stock next to the pad. Now with the stock on the guide, the pad can be ground to as close as the guide is set out from the face of the disc. I have my sander approximately 30" from the floor so I can sit on a shop stool.

This set-up works real slick on all but cheek pieces and Monte Carlo stocks.

*- Richard Carlson, Wichita, Kansas*

## **MASKING STOCKS**

Due to its stretching quality, I have found plastic electricians tape to be superior to masking tape for masking stocks when attaching recoil pads. . .

*- John Landis, Ithaca, Michigan*

## **SOCK YOUR STOCK!**

Most gunsmiths cut and fit a piece of paper to buttstocks when installing a recoil pad. This works fine to protect the gun from those minor scratches and abrasions, but they don't last long. So I use an old cotton sock. Still has plenty of stretch in it, and conforms to the shape of the stock real well. First, I cut the toe out, and pull that end over the butt, up toward the grip until the top of the sock is about 1-1/2" from the edge of the new pad. Then I run a 1" wide masking tape around the top of the sock to anchor it firmly, and then spiral the tape around the sock toward the toe of the sock and anchor it to the wood when the length of the sock finally gives out. Finally, I run a couple/three widths of wide Scotch tape between the end of the masking tape line and the edge of the new pad to give me a good flat, tough surface to grind the pad down to. Works like a charm, and makes the stock very easy to control on the sander.

*- Marty Shaw, Elko, Nevada*

## **"BLUE TAPE" SAVES STOCK FINISH**

I have been using the standard method of masking tape, grind down as close as I dare with the disc sander and filing and sanding the pad the rest of the way. The trouble is that the Scotch tape we all use is clear and you can be thru the tape and into the stock



before you know it. The answer is to coat the tape with Dykum Blue. As soon as your abrasive hits the blue you know it. Simple as hell, but sure works!

- *Will Fowler, Anchorage, Alaska*

## **STEEL FOIL PROTECTION FOR PAD INSTALLING**

We take a piece of your stainless steel foil and wrap the butt of the stock with it, taping tightly with a butt joint (no overlap) as a stock protector when grinding down a recoil pad. You can really cut the pad down fast without worrying about stock damage because before can nick finish, have to grind through a lot of steel! I have been using for several years, and much prefer it to tape as it does not roll up and expose the wood the first time it is touched with sander. (And won't lift finish as sometimes happens with tape. - Bob B.)

- *Tony Didamo, Golden, Colorado*

## **RECOIL PAD FINISHING WITH A FLEXIBLE SHAFT**

When fitting recoil pads I have found that the final sanding is best done with a flexible shaft driving a 1" x 1" mandril with varying grades of paper sleeves. The power unit is my drill press. With the stock held firmly, I can go right down to the finish without damaging it.

- *Frank Zangel, Bulawayo, Zimbabwe*

## **RECOIL PAD SHAPING ON A GRINDING WHEEL**

First I install the pad on the stock, after proper length has been determined. Then I dress the pad down and shape it using the side of a 6" medium grit grinding wheel. I go down to about 1/16" from the wood, being careful not to go any further. I next put a Brightboy 1/4" x 3/4" number 70 abrasive wheel on the Dremel tool, and with the stock laying on the bench, I finish the hard rubber part down even with the wood. Then it's back to the grinding wheel to finish the softer rubber down even with the hard. With a little caution and practice, it will look as good or better than a factory job.

- *Gary Olsen, Malta, Illinois*

## **IT'S ALL A MATTER OF DEFINITION**

The Unabashed Webster, as interpreted by our own Wayne Fleming, gives the following as examples to help explain the nuances of difference between words: "Confusion" is 1 gal and 1 left turn. "Excitement" is 2 gals and 1 secret. "Disaster" is 3 gals and 1 sale item. "Chaos" is 4 gals and 1 luncheon check during rush hour.

- *Wayne Fleming, Montezuma, Iowa*



## THREADED PLUG SOLVES PAD MOUNTING PROBLEM

I've found it never to fail when I'm restocking a single shot such as a .310 BSA Martini that the bottom screw for the recoil pad falls right in the middle of that darn through bolt hole. So after drilling new hole in the recoil pad, I got the idea of running a pipe tap into the hole and threading or tapping the hole.

Then with a dowel of about the right size, I thread it and then screw it into the hole and cut it flush with the end of the butt stock. Mark location of the recoil pad screw, remove plug from the stock and then drill the hole. Replace plug in stock and align recoil pad screw hole in the proper location and install recoil pad.

If the stock ever has to be removed from the action, just unscrew the wooden plug. (If you had glued a plug in, you would have to drill it out.) With this method I simply use a punch to start the plug out until I can get my finger on it. Use a hardwood dowel for best threads, and it will all depend on the size of the through bolt hole when picking the size of the dowel and pipe thread.

- Dan J. Porter, Mt. Vernon, Ohio

## REMOVABLE RECOIL PAD SCREWS

I use two high-quality Phillips head screws for rifles or shotguns where the butt stock must be removed from time to time, for cleaning or repair. The screws have to be good hard steel so that they do not strip out, becoming unremovable. Finally use a scribe to punch the two holes through the pad, do not cut slits as normally done.

Pre-drill the stock as usual. Holding the pad in place, dip the two screws and the screwdriver tip in a liquid detergent. Press the screws through the punched holes and screw the pad on tight. You cannot see the holes, and the pad will not be chewed up, no matter how many times the pad is removed.

Finally, don't forget to tell the customer what type of screws you put in the pad, so that he can get them out. While you are at it, you might even be able to sell him a screwdriver that will fit.

- Ray Serra, Coram, Montana

## CLEANING RECOIL PADS AND WHITE LINES

I found that if you get some finish, such as Linseed oil, on a recoil pad, or want to clean up the white line; a typewriter eraser of the pencil shaped variety works quite nicely. It is quick, easy, and inexpensive.

- R. J. Van Den Bussche, Chicago, Illinois



## REMOVING STOCK FINISH FROM BUTT PADS

Will give away a 'secret'. If you would like to oil finish stock with Tru-Oil without taping recoil pad, just slap it on stock and pad. Then, when stock is finished, spray pad with WD-40 and wipe oil residue off. It'll take it off the pad.

- *Will Landordale, El Paso, Texas*

## FINAL FINISH ON A RECOIL PAD

When I am installing a recoil pad and want to give it a really nice smooth finish, I mask off the stock with a good grade of masking tape and then use auto body or stock rubbing compound on the recoil pad. It does a beautiful job and really makes a pad job look classy.

- *Harold Neuman, Havre, Montana*

## CUTTER, SCRAPER AND SHELLAC STICK 'CATER

Broken box magazine springs, properly trimmed, make a much better applicator for working shellac than the normal oversize putty knife. The spring pieces can be cut to any shape or size and a slit dowel makes an excellent handle.

I have also found that trimmed and sharpened, they make excellent scrapers and cutters for those hard-to-get-at stock inletting jobs. Have also used pieces of springs along with Acraglas in working over recoil lug areas.

- *Dick Deveraeux, St. Ignace, Michigan*

## CARPET SANDING PAD

One very small item I have found helpful: a small piece of indoor/outdoor carpet with rubber backing makes a good backing for sandpaper. You can use the side with the soft rubber for getting around sharp areas like finger grooves in a grip or turn it over and the stiff carpet side takes out most of the ripples on the flatter surfaces. . . and you can cut the carpet strips to fit almost any area you want to sand.

- *Maj. Joseph Steward, APO, New York*

## WHILE ON SAFARI

As Ivor Koch, Mayor of the neighboring community of What Cheer, tells it, three sporting gents were out after fox one bright winter morning when the trio came upon some tracks running down through the valley. The "ol' codger" of the three announced with great authority that, "those are mule deer tracks, an old buck with a big spread, and heading that-a-way". The second hunter, not wishing to appear impolite in view of the old gentleman's



years, but violently disagreeing, said, "Ah now, Al, I do believe those are the tracks of that moose spotted last night over on Saltlick ridge, and he sure ain't going that-a-way, a-tol, but around overn by that little rise there." The third, tho just a lad and somewhat in awe of the many accumulated years of hunting and tracking experience of the two elder members, also disagreed, but before he could even open his mouth . . . the 3 of them got run over by the train!

- *Ivor Koch, What Cheer, Iowa*

### **OLD RECOIL PAD SANDING PAD**

Thought maybe the guys haven't found every use for those old used recoil pads. I used one of the better ones recently as a sanding block! It was flatter than the flexible rubber type, especially on the "finishing touch" during pad installation.

- *Gregg Simon, Mobridge, South Dakota*

### **SMOOTH OUT THE FINAL SANDING**

When sanding a stock with a wood block, you frequently end up with a lot of "small flats" on the surface of the stock. To remove these in the final sanding passes, I use one of those solid sponge rubber blocks sold for cleaning suede leather articles as the backup block for the sandpaper. Used carefully, it will conform to curved surfaces and round off the edges of those small flats ever so nicely. And the thing seems to last forever!

- *Max Lindauer, Washington, Missouri*

### **SPONGE SANDING BLOCKS**

I keep several of those cellulose sponges that you get at the corner grocery for sanding pads on stock work. Cut them to any size that you need. A curved surface can be sanded with ease. When the sponge gets too compressed or mashed out of shape, wash it out thoroughly with water and let dry. They return to their original shape. If you want one a little harder, use some of your wife's liquid starch. Put a little in a pan, squeeze it into the sponge and let it air dry. Even works nice for whiskering when slightly damp.

- *D. C. Paul, Bishop, California*

- *Andy's Leather & Sports Shop, Safford, Arizona*

### **DISSOLVE DYE IN ALCOHOL**

Instead of mixing the water soluble dye powder with water, I use wood alcohol (methonal). When I apply it to the wood, it dries faster and doesn't raise the grain of the wood as badly. And, if it



gets too heavy I can just wipe it off with clean steel wool which quickly takes care of any excess.

- *Lew Sanchez, Fayetteville, North Carolina*

## NITRIC ACID TIGER STOCK STRIPES

To bring out the tiger stripes on a maple stock use 30% Nitric Acid with distilled water. (ED. NOTE: Be sure to add the acid to the water. **Never** do it the other way around.) Apply after the stock is sanded dead smooth and before any other color is applied. Let stock set for 24 hours and sand lightly to remove any whiskers. Then finish the stock as you normally would. (I'd run a sample test run on a small piece of wood to be sure I liked the colors first)

- *E. R. Johnston, Fremont, Iowa*

## STAINING BIRD'S-EYE-MAPLE

In reading my copy of **Kinks I**, I noticed that you left out my favorite method of staining and really bringing out the eyes in maple. I use a 6% solution of Chromium Trioxide. After the second feathering, I make my 3rd raise by brushing on the Chromium Trioxide solution with a brush and literally soak the wood. Let it work until the desired color is reached. Stop the action with a 50/50 vinegar-water solution applied liberally (enough to waterlog it) and let dry. Final sand with Durite superfine wet-or-dry (400 grit) and don't panic when it turns the finish a muddy mustard yellow - it'll come out beautiful. Use a sanding block, tho, to avoid taking the edges off the corners or hard edges of the eyes. I use Tru-Oil to finish.

- *William Reinecke, White Sands Proving Ground, New Mexico*

## AGING STAG

For my fellow gunsmiths - to make new stag grips 'age instantly' purchase from drug store a 25¢ tablet of Potassium Permanganate. Dissolve in 1/2 pint of water. Submerge grips for 3 minutes, take out and rinse off, dry and wax. Turns new grips, knife handles, etc., dark as if real old. Very poisonous in high concentrations, so be cautious. . . (BB: - also good stuff for turning light maple a nice golden brown as well as some other lighter woods. A real old-timer method of wood staining!)

- *Allan Jamail, Jacinto City, Texas*

## POLISHING PLASTIC AND HORN

To finish off the plastic horn caps, butt caps, and spacers, I simply sand down with various grits of sandpaper, metal polishing



grit, then finally take a 1" x 1" x 3" piece of white pine with corners rounded off.

This brings out a high friction gloss on all sanded surfaces and beats anything that has been tried yet. It is really easy to do and the results are excellent!

- *Norman Rothermel, Erie, Pennsylvania*

## **POWER OF POSITIVE THINKING**

One of the local farm wives who was having a problem with her layin' hens falling down on production reported a considerable increase in output. In questioning her about what she had done to get the girls back on the line so quickly, she said: "Oh I just took that empty red and white bucket we bought chicken in for last Sunday's dinner, and hung a sign on it that said" 'An egg a day keeps Colonel Sanders away'."

- *Bob B.*

## **GUN STOCK VARNISH**

When buying varnish for gun stock work, keep right on shopping and hunting until you find "church pew" varnish - the finish stands up under constant body heat, cloth pressure, sweat and the like - yeah, wet diapers, too... F.B. This could lead to some real "unvarnished" tales but will abstain! However, "Alle künst ist umsonst wenn ein Engel auf das Zündloch brunst."

- *George Stankov, Jr., Chicago, Illinois*

## **KEEP THE LEVEL HIGH**

When using stock finish in a bottle or can, always drop a marble or two into the bottle when you are finished to keep the level of the liquid near the top of the bottle. By cutting down on the empty air space above the finish surface, the finish never gets thick or gets that crust on it. We always have a small supply of marbles in a can in our stock room just for this use. (This is a popular suggestion as you can tell from the number of credit lines! Bob B.)

- *T. C. Kennon, Stone Mountain, Georgia*

- *Bob Hill, Northridge, California*

- *Dan Plamondon, Crescent City, California*

## **STORE TRU OIL IN A SYRINGE**

To keep Tru-Oil from hardening, I keep it in a large old disposable syringe. I also find this method handy for measuring and pouring.

- *Larry Maypin, Grey, Tennessee*



## SHAPELY RAG FOR APPLYING STOCK FINISH

Being recently married, I just discovered the wonderful stock finish application rag that can be made out of his wife's old slips. Make a little dobber/ball out of it and apply in usual manner. No lint, very soft and holds its shape well... (Note by BB.- We've quite a collection of excellent kinks from Dave and I hope he won't mind if I kid him a bit about that "soft and holds its shape well" bit - Hmmmmmmm!!!???)

- *Dave Christen, Wadena, Iowa*

## SPONGE-ON STOCK FINISH

I cut a one-inch square of good quality sponge rubber and use one of those spring-type clothespins for a handle to make applicators for putting on stock finish. I get no runs on the stock, no bristle marks to have to level out, a better finish... AND, for clean-up, you just throw away. How can you beat a deal like that - even with a loong pole!

- *Jack Winslow, Caldwell, Idaho*

## THROW-AWAY FINISH APPLICATORS

Been using these for about 4 years and they work just great for applying Tru Oil, Linseed, lacquer, varnish - you name it. Go down to your local surplus supply house or dime store and buy scraps of thin foam rubber. Cut this into whatever small shapes you want and then staple these chunks onto Dixie-cup sticks, paper clips or whatever with a hand stapler like you staple paper together with. You are in the paint brush business! You can't ask for better results, and when you are finished you can either clean with brush cleaner or toss them into the old circular file!!

- *W. C. Wilber, Spartanburg, South Carolina*

## ACRAGLAS "FILLER" FOR OPEN GRAIN STOCK

After whittling out a stock from a piece of American walnut awhile back, I discovered it seemed to have an especially open grain, even though it was a fairly nice piece of wood and had worked well. Anyhow, when I was done fussin' and mutterin' over it with the sandpaper, I brushed on a coat of Acraglas, let it set for an hour or so then hit it again. I set it aside for a couple of days to dry, then cut it down to bare wood. Presto, the filling job was done. Used another 3 to 4 coats of poly finish and rubbed it out with silver polish (customer wanted a mirror finish).

The stock turned out beautifully and I saved a lot of time and elbow grease.

- *Ronald Prichard, Ketchikan, Alaska*



## APPLYING ACRAGLAS AS A STOCK FINISH WITH THE FINGERS!

Author and engraver James B. Meek brought in a rifle stock the other day, finished, checkered and carved, that he had done applying the epoxy with his fingers. It was truly beautiful! Here's how he did it: Using his powder scales he weighed out 160 gr. of resin and 40 gr. of hardener, mixed and applied to the complete stock with his fingers! In another hour he weighed out the same amount and applied a second coat and repeated for two more coats. He says the mix flows nicely and does not have as many humps and ridges as you might expect. A day or two later he sanded the finish smooth, using blocks and pads to insure a perfectly level surface. Before applying any finish, he laid out the outlines of his checkering pattern and carving borders. Masking tape was applied and trimmed to these outlines and the finish applied over the tape at the same time as applied to the stock. When the finish had set, he trimmed thru the finish along the edges of the tape and lifted it off, leaving unfinished wood for the carving and checkering. . . . Personally, I'd suggest you try this on an old hunk of stock before trying it on a customer's gun to develop technique. A beautiful, beautiful finish that is impervious to solvents, oils, water, humidity - you name it. . . AND it requires no special equipment to apply. . . Just be very sure you are not allergic to the chemicals in Acraglas. Some people are, and you might be another.

- Bob B.

## THE ONE GREAT CURE

Two old hunting buddies stopped by the funeral parlor to pay their last respects to an old hunting friend - one with whom they had shared many a trip to the field. As they were standing by the casket, one turns to the other and says, "He sure looks nice." "Well," says the other, "he oughta. He just got out of the hospital two days ago!"

- Ken Hoyt, Grafton, Wisconsin

## HOME-MADE PENETRATING STOCK FINISH

I have found a very excellent stock finish and thought that maybe others might be interested in my method and how I use it. My formula is: 1/4 ounce of Tru Oil (or Varathane Plastic Oil Sealer); 1-1/2 drams of Japan Dryer; and 1-1/2 drams of Mineral Spirits or Paint Thinner.

Stir well and apply with a soft cloth (lint free) folded into a 2" square pad. Flow the finish material onto the wood and don't over-



track.

The above quantity is sufficient to completely do a stock. You should be able to apply a coat about every three hours, and the beauty of this finish is that you will be able to obtain superior penetration, fast filing, and a smooth coat equal to a spraying operation. The thing I really like is that it goes into the wood and not onto it.

After applying three coats of the finish, I then hand rubbed three coats of Tung oil on top of it. This finish is most definitely in the wood and so far I have not had any "spider web cracks". I've even tried some severe tests by freezing the finished wood and by leaving it in a 150° oven for two hours. I've never seen any change in the finish. (Dick sent us a sample of a stock he finished and applied only three coats of his formula and the wood has a very fine, flat finish on it. Bob B.)

*- Dick Thaxton, Broomfield, Colorado*

## **CASTOR OIL AND LACQUER STOCK FINISH**

Take 4-ozs of lacquer and add one teaspoon of castor oil - by doing this you can brush and get a beautiful finish! (Note from Bob B.: We used to have a doctor here who used castor oil as a cough syrup . . . take two tablespoonfuls and you didn't dare cough!)

*- Bob Cooper, Key Largo, Florida*

## **STOCK FINISHING - QUICK AND EASY**

I fill the wood in the usual manner, (since I like a waterproof seal, I use polyurethane) until the surface is absolutely smooth. Then rig up the stock in the checkering cradle and apply Tru-Oil from the *spray can* in a misty coat. Run your fingers lightly over the entire surface while it is still wet - the quicker the better. Don't worry about little streaks from your fingers - they will level themselves out. Let dry in absolutely dust-free area. The result is absolutely beautiful! After about a week it can be rubbed out, but I don't think you will want to! Seems to be equivalent to about the finish I used to get with 6 to 8 coats carefully rubbed out between each coat. For best results, clean wood surface with alcohol to remove all dust before applying the Tru-Oil. And, don't forget to wash your hands really good, too. That Tru-Oil in the spray can is just about the best thing since sliced bread!!

*- John Lovallo, Lynchburg, Virginia*

## **HIGH GLOSS ON STOCK FINISH JOB**

I sanded down the several coats of Tru-Oil to just above the grain, then put on several coats. When set up, wiped that down



with WHITE GASOLINE and then polished with finger dipped in gasoline. Final polish with paper towels and waxed with Tru-Oil wax. Looked like a mirror. (Watch white gas in the shop; that stuff is powerful flammable. Be sure there are no open flames, no smoking and lots of ventilation. In fact, best do it out on the drive. Frank B.)

- *Morgan Owens, Pine Bluff, Arkansas*

## STOCK POLISHING MACHINE

I do a lot of high-gloss stock finishing (3-4 a week), and rubbing them out by hand got to be tiring, so I went home and got my electric shoe polisher, a Ronson "Roto-Shine Magnetic". It has magnetic discs that have clamps on them to attach a cloth (I use felt), and a soft rubber pad. After using 600 wet and dry paper with mineral spirits, I put a felt cloth on the shoe polisher, smear rubbing compound on the stock, flip the switch on "the machine," and 3 minutes later the stock is rubbed out.

- *Scott Keller, Bradford, Ohio*

## SURFACE SMOOTHNESS GAUGE

So you think the surface of a piece of glass is smooth? Or that you have a truly smooth surface on a gun? Or that anything else that looks "dead smooth" is such? Well, just take the cellophane wrapper from a cigarette pack, slip two fingers inside the cellophane and lightly rub over the "smooth" surface. It will feel as tho the "smooth" surface were imbedded with coarse gravel. Why the cellophane greatly magnifies the irregularities of the surface, I don't know — but this I do know: It sure enuff do just that!!

- *Bob B.*

## STEEL WOOL FOR SATIN FINISH

A thin steel wool pad under an orbital sander makes quick and easy work of reducing finishes on gunstocks or for satin finishes. No steel shards in the fingers either!

- *Vic Strawbridge, Dover, New Hampshire*

## "MURPHY'S LAW" DEPARTMENT

Patrolman stopped this hunting buddy of mine and asked him if he knew he was driving without a taillight. My buddy jumped out, ran to the rear of his car, and gave a low moan. His distress was so great the cop was moved to ease up on him a bit. "Aw, come now," says the cop, "you don't have to take it so hard. It isn't that serious." "It isn't?" cried my buddy. "Just where in hell is my trailer?"

- *Ken's Gun Shop, Roxie, Mississippi*



## **RAPID STOCK FINISH CURING**

When trying to hurry along the drying of a stock finish coat, try putting it in a foot locker, trunk or specially-built box along with the wife's hair dryer set on high heat for a couple of hours. This really speeds the drying time!

Just watch your time in the cabinet; wouldn't want to warp the stock or dry out the stock so much you chance splitting it.

*- Greg's Custom Guns, Phoenix, Arizona*

## **POLISHING OLD FINISHES**

Soak fine steel wool with Tru-Oil. Use this on old muzzle loading stocks or any other old and dirty-looking stock. Cleans off the old dirt and grime. Wipe off and polish, and it leaves a finish that looks better than factory finish - and does it quickly. (Note from BB.: Be sure you are not ruining the value of a collectible gun by doing things to the original finish that will decrease its value.)

*- David Christian, Wadena, Iowa*

## **DRYING CABINET IN OLD FRIDGE**

After opening my shop I found that I needed a drying cabinet, but was too busy or lazy to build one. So I picked up an old refrigerator (usually free for the hauling). Rewired to by-pass the worn-out compressor and door switch, and put a 100-watt light bulb in the socket. Stays nice and warm and absolutely dust-free.

*- Scott Keller, Bradford, Ohio*

## **SCHOOL-DAZE CHECKERING CRADLE BENCH**

To do a good checkering job, you've gotta have good steady support for your cradle.

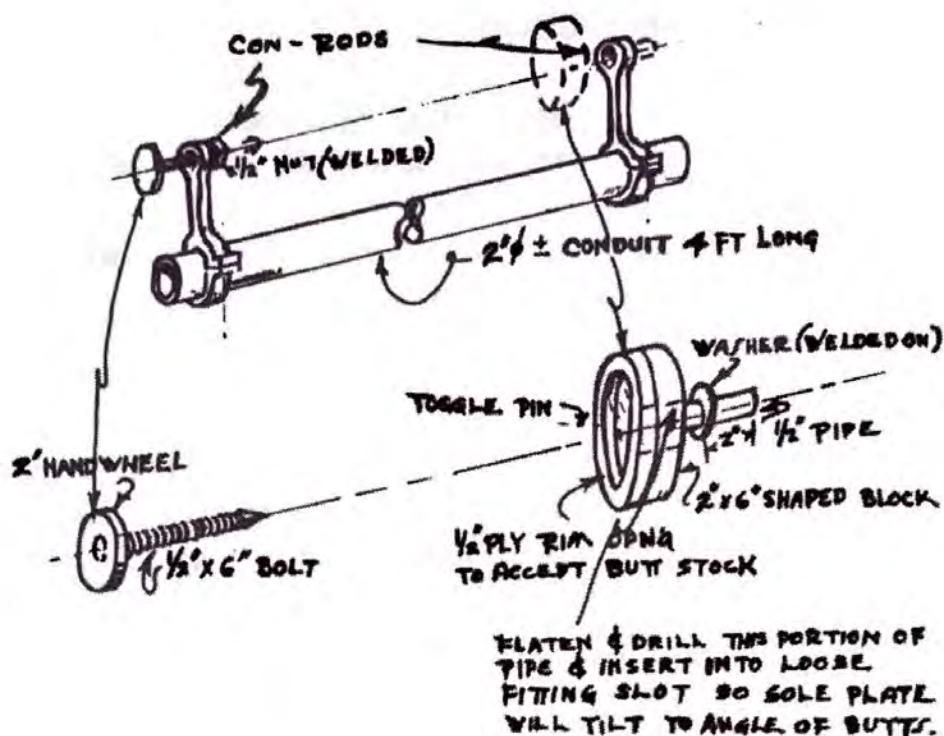
The one obvious solution is to build a cobblers-type bench; and we've all seen dozens that are well designed and comfortable to work on. I stumbled onto an easy alternate solution while sitting through an open house at my daughters' school. Get ahold of an older (mid-50's) flip-top desk. (I got one at the Salvation Army store for \$3.50.) Take off the desk itself and put a swiveling vise on top of the pillar that supported the desk top. This pillar has enough up and down adjustment to let you set your cradle at just the right height. The seat on mine also adjusts, plus swivels and slides fore and aft. At its uppermost position, even a six-footer will find it comfortable to sit on.

*- Doug Lidster, Adel, Iowa*

## **SUPER-EASY STOCK CRADLE**

The sketch is of a gun stock cradle I whipped up within a few





hours time and after several years of use I am quite happy with it. The basic parts are two old connecting rods and a length of electrical conduit. Rods are easily clamped to any position desired, giving unlimited positioning.

- L. S. Hauser, Santa Rosa, California

### CHECKERING CRADLE EXTENSION

I tried to mount a Mannlicher-type stock in your fine checkering cradle and it was too short. So, taking a piece of 1" x 2" pine I



had, I drilled a row of holes, spaced 2" on centers, and 1/4" diameter. Two 1/4" x 4-1/2" hex head bolts hold this extension onto the cradle, while the head is held to the extension with one 1/4" x 3" hex head. So far, works just fine.

- John F. McAhon, Crane, Texas

### HOW TRUE!

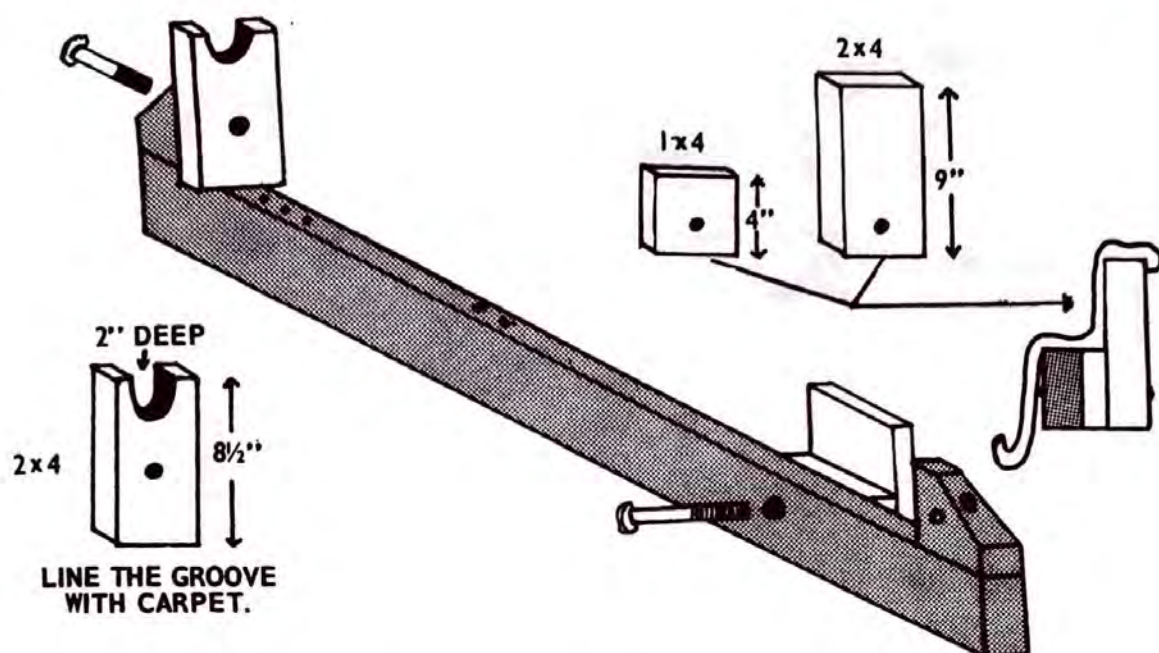
Two things every gun owner in the world can do better than anyone else: boil water and tell his gunsmith how to fix it!

- Bob B.

### MORE USES FOR CHECKERING CRADLE

Just received one of your Checkering Cradles the other day





and think it's great. Although I did not have any checkering that was pressing, I did find a use for the cradle, and, with a couple of improvements, it has paid for itself in just 2 days with labor saved. I made two more pieces for the Cradle and have an instant stock or rifle vise. Mounted and bore sighted 5 scopes with it, and have it set up now for inletting a stock - and, if things keep going, just might have to buy another to use for checkering.

- Karl George, Mitchell, South Dakota

### SCOTCH TAPE MASTER GUIDE LINE

Use scotch tape to lay out my master guide line in the checkering pattern. It works great and you can use it as a guide to control your cutter. Then remove the tape to finish the pattern.

- Larry Maypin, Grey, Tennessee

### STRAPPING TAPE FLEX RULER

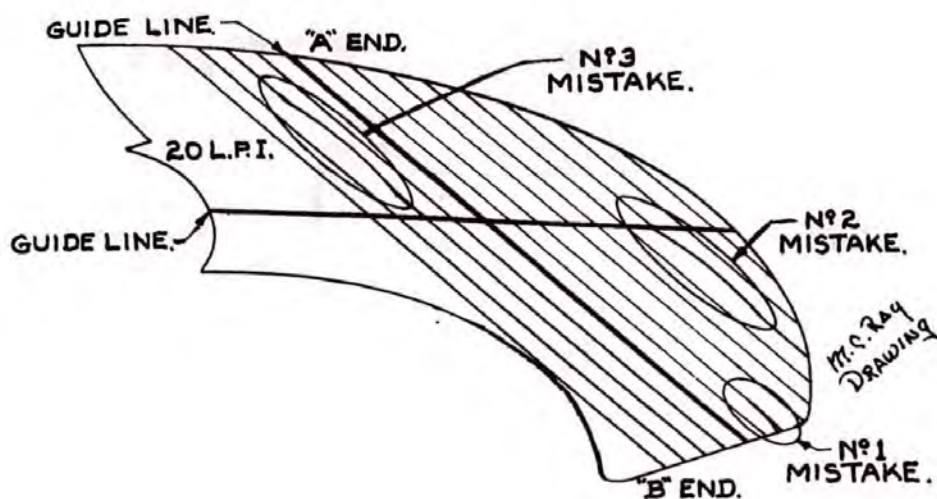
The plastic strapping tape (the kind that heat seals) makes a beautiful straight edge for laying out master lines, pattern edges, complex curves and so on. The regular 3/8 inch is fine for most work, but if you have a real complex curve to get around, it can be split for more flexibility. The clear is best as you can see through it. I laid out a spiral the other day with a varying pitch, and got it perfect the first time.

- R. E. Dozier, Winters, California

### CORRECTING CHECKERING MISTAKES

The drawing shows three common checkering mistakes and suggestions on how you can correct them.





Mistake No. 1: Line curved at the end to the guide line side. To correct use an 18 lpi to mark "B" end and scribe new pilot line with flexible ruler. The Line next to it will be spaced with 20 lpi cutter correcting this mistake.

Mistake No. 2: Line curved out in middle away from the guide line side. To correct mark "A" and "B" end with 18 lpi and scribe with flex ruler. Next line will be spaced with 20 lpi.

Mistake No. 3: Line curved in middle toward the guide line side. To correct mark "A" and "B" end with 20 lpi and scribe with flexible ruler. The next line will be spaced with 20 lpi.

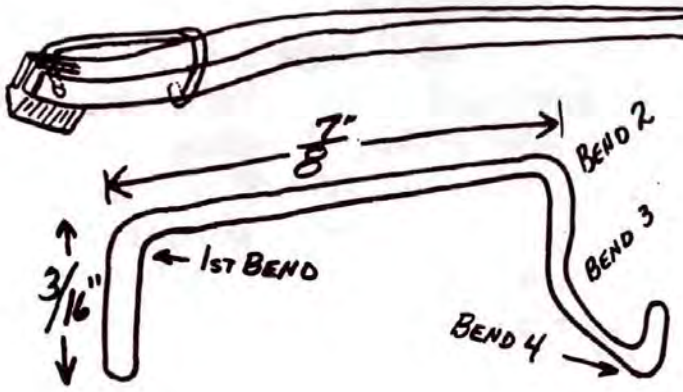
Once the lines start going off, they will always get worse. These correcting methods will allow straight lines over most of the pattern at least. The "points" in the corrected area will have to be deepened more, of course, to bring them to a sharp point.

- Will Fowler, Anchorage, Alaska

## SPRING CLIP TO HOLD DEMBART CHECKERING HEADS

I use a DemBart checkering tool, and it's a very good checkering tool, but I don't like the brad that is used for holding the cutting head in place, so I designed a clip. To make it, use a length of your .0475" spring. Do not cut to length; leave it full length, which serves as a handle to hang on to. Polish the end that holds the cutters into the handle to a slight taper - this will hold the cutter snug in the handle. The wire, as is, is a few thousandths larger than the hole in the handle. The taper keeps the cutter from moving back and forth in the handle, helps to prevent over-runs at the border. The bends can be made with a needle nose pliers. First bend should be a few degrees less than 90 to keep some tension on the handle so the clip is tight. Don't make the clip too short; 7/8" is about right. If shorter, you can't snap it into place with your fingers and you will have to use pliers. Bends 2, 3 and 4 are self explanatory. The short end under the handle should be kept short, as this



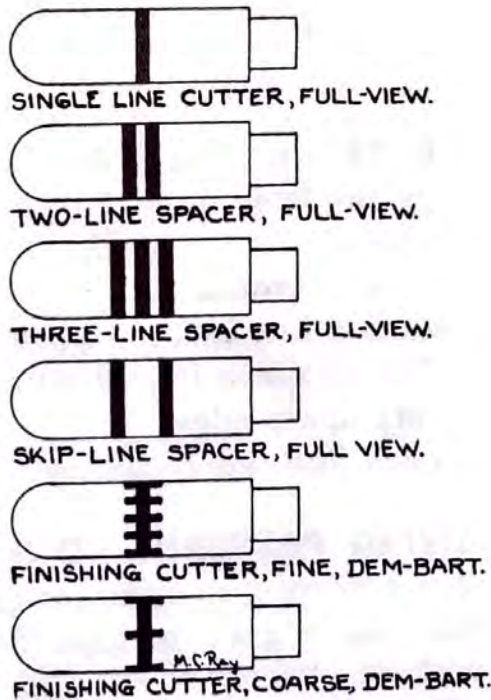


makes it easier to snap in or out of place. After you have made the first one, you can make one in a couple of minutes.

- Carl Pearson, Sioux Falls, South Dakota

### STRIPE-CODING CHECKERING TOOLS

I have several types of tools that are easy to find, ie: jointer, S-1 (both forward and backward), Viener, etc., but my regular and skip-line tools give me a fit. I go as far as I can with the MMC machine and then reach for a hand cutter, and pick up every tool on the bench before I find the right one. So I painted the handles (could have carved them just as well). Different colors for each one would be okay but it's too much for my one track mind! So here is what I did:



Lots of room for more designs. I did all of mine and in 10 minutes - ended all my frustrations. NUF SED!

- Lt. Col. F. B. Conway (Ret.), Las Cruces, New Mexico



## CARVING ROSEWOOD

A customer asked me to do a little carving on a set of rosewood grips to fancy them up a bit. Wow, those rosewood jobs were 'sumpin' else. I've worked rosewood before, but never have I found any as hard as that! Normal veining tools wanted to ride the surface like I was cutting steel. I tried several things, including some of the metal engraver's tools, with little luck and a growing knot of frustration/anger a'building in my gut! That damn stuff is harder than a border businesswoman's heart!! Being a typical engineer, I considered everything from a carbide-tipped concrete chisel to a 20-ton drop forge until I worked my way down to my MMC Checkering head with High Speed cutters. I set the guide as wide and as high (out of the way) as it would go, and it worked beautifully! Mind you, caution with that tool is always needed, 'cause even in this hard rosewood, the cutting rate is fast.

- *Harris W. Foster, Dallas, Texas*

## WHO GETS THE BILL

Two gunsmiths, well known for being so tight that they still had the change from the first time they put money in the contribution plate at church, were out to dinner in one of the swankier joints enjoying a nice steak. When the time came to pay the bill, each tried to outdo the other in avoiding the check until they decided to flip for it. The winner called "heads", the loser yelled "fire" and they both escaped in the confusion.

- *Bob B.*

## GRAVERMEISTER FOR BASKET WEAVE CHECKERING

My Gravermeister is the best thing I have ever seen for cutting basket weave checkering on gunstocks. For tool bits, I use 3/16" Rex 95 lathe tool bits, ground down to 1/8" square on the surface grinder. This makes a fine tool for wood, but is a little brittle for steel. However, the Rex aaa is just right for cutting steel, and takes and keeps a very sharp edge.

- *Earl Harris, Greenwell Springs, Louisiana*

## TRANSFERRING CARVING PATTERNS TO STOCKS

After drawing full-size carving designs for relief carved stocks, it took a while to think up a good method for transferring the designs to the stock without altering the design or getting it placed crooked on the stock. The following method works great for me.

First, trace the pattern onto tracing paper; and then reverse this tracing and redraw it from the back side, using a 3B artists pencil (the lead of this pencil is very soft and will transfer easily).



Turn the tracing over with the soft lead drawing toward the stock, position it on the stock, tape it in place carefully, and burnish the design onto the wood using Brownell's handy engraver's burnisher. Remove the paper tracing and firm up the lines on the stock with an HB or #2 pencil if necessary. I've also found that spraying the finished transfer with Krylon #1306 Workable Fixatif (an artists spray coating) will fix the design against smudging while carving without any adverse effect on the wood or it's ability to take stain later.

*- Malcolm Kenyon, Kelso, Washington*

### **GUNSTOCK HANDLE**

Take any old, large-size rat-tail file that has lost its cut and is of no more use in the shop and stick it in the stock bolt hole in shotgun stocks when you are working with them. Makes excellent handle to hang on to when putting on stock finish, spraying, whiskering, whatever. Just give a quarter-turn when firmly stuck in and locks it up tight!

*- Brent Umberger, Cambridge, Ohio*



## CHAPTER 2

# ACTIONS, RECEIVERS & BARRELS



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### NO-MAR BARREL REMOVAL

When removing a barrel from an action, the chances are that some of the blue will be removed from the barrel also. Everyone that has removed a barrel has done it sometime or another. Try putting 1½ wraps of Saran Wrap on the barrel where the barrel fits the barrel vise bushing. Prevents messing up the bluing.

*- Gary Thiry, Sacramento, California*

### EPOXY BARREL VISE PAD

For those hard-to-remove barrels or when installing a nicely re-blued one without scratching it, I wrap a strip of heavy brown paper saturated in quick setting epoxy around the barrel. Let the job sit over night or until the glue has had time to set, and this



difficult job turns out to be very easy. To remove the glue and paper, just apply a little heat with a propane torch, and the bluing will not be harmed either.

- Maj. Verne Lietz, USAF (ret.), Peshastin, Washington

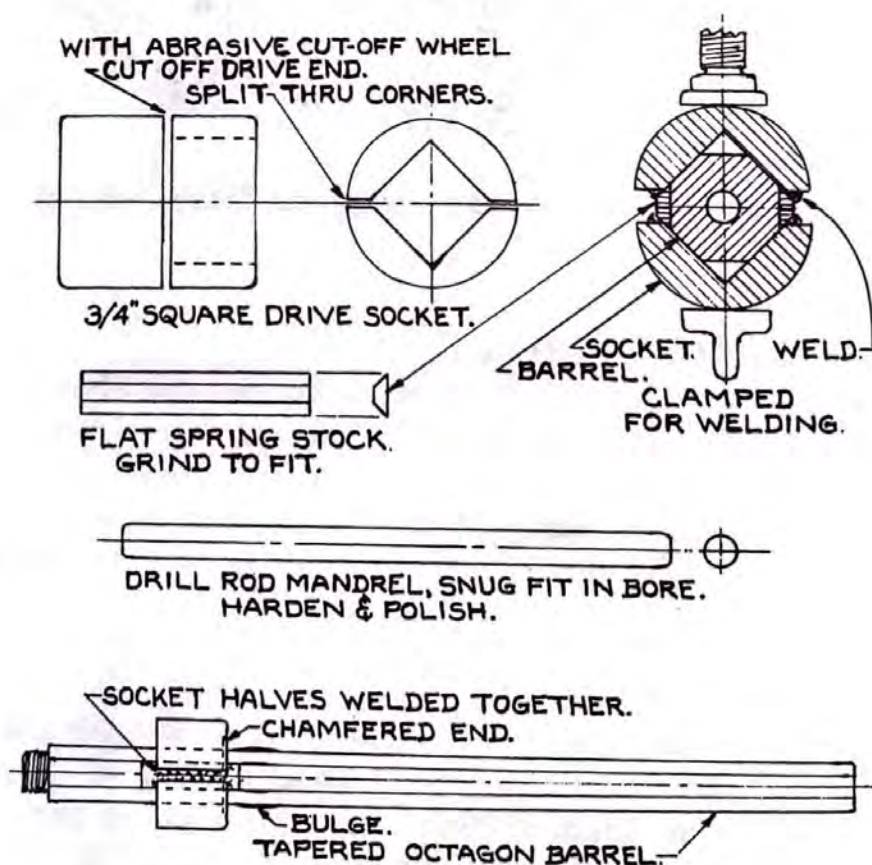
## DOG OFF THAT BARREL

I removed barrels for years with nothing more than a set of lathe dogs, a good machinist vise and two pieces of walnut or applewood and some powdered rosin. A lathe dog is selected of the proper size to fit the action, a piece of leather is inserted between the dog and the action for protection and then tightened securely. Dust a little rosin on the barrel and place it between the two blocks of wood, (which should be about 1½" thick) as close to the receiver ring as possible. Place the blocks in the vise and tighten until the blocks take on the shape of the barrel. About 3 good blows on the lathe dog with a 3-lb hammer and the barrel is loose. Just reverse the procedure for installing the barrel on the action. I have never damaged an action or barrel with this set-up, and works on about every bolt action I have tried.

- John Chomyn, Newburgh, New York

## OCTAGON BULGED BARREL SWAGER

I had a Marlin Model 1893 that was brought to me in very





good condition, except that the barrel had a bulge in it. The customer was hoping that I could get the bulge out without having to replace the barrel, as several other shops he had taken the rifle to said it couldn't be done. This is how I did the job, and how I had one very happy customer.

Once you have made up the "swaging die" and mandrel per the above drawing, place the mandrel in the bore to span the bulged area. Then slip the die on from the chamber end of the barrel and set muzzle end of barrel on a hardwood block. Use a piece of pipe and a large hammer to drive die down over well-greased bulge; move die one flat around and drive back over bulge from opposite end. Repeat process on remaining two sets of flats, no heat is needed, all swaging should be done cold. Once finished polish complete barrel and reblue.

- *Bob Kellison, O'Fallon, Missouri*

### **TAKING BULGES OUT OF SHOTGUN BARRELS**

Remove the cutter blade from a tubing cutter and turn a steel roller to exactly match the other two rollers and install in place of the cutter. Slip a mandrel of the correct size for the bore of the barrel you are working on under the bulge (be sure to measure, there is lots of variation), put a few drops of heavy oil where the rollers will touch the barrel, and roll the bulged metal back into place. Work slowly and carefully, and you can even do it without damaging the blue.

- *G. W. Van Hynings, Panama City, Florida*

### **NEVER HAVE SO MANY HAD SO LITTLE**

Gunsmith customer wrote in the other day saying he'd been to see his doctor and saw the darndest sign on the office wall: "BRAIN TRANSPLANT CHARGES" and under that heading was the following: "Lawyers, \$250.00 per pound; Doctors, \$500.00 per pound; Managers of Parts Departments, \$1,500.00 per pound." Customer said he read the sign several times and finally could stand it no longer and asked the doctor, "What in heck is that all about?" "Well," said the doctor, "we have actually devised a method of giving people brain transplants so they can be what they want to be." "Yeah" says the gunsmith, "but howcome the high price on managers of parts departments?" "Have you any idea," said the doctor, "just how many parts managers it takes to get a pound of brains?"

- *Bob B.*

### **STRAIGHTENING SHOTGUN BARRELS**

After reading several methods of straightening shotgun bar-



rels, I thought that I would pass on what I was taught. Take a 25 pound bag of lead shot, ( $7\frac{1}{2}$  or 8 seems to work the best for me), and lay it flat on a solid workbench or counter top. Then with a one-hand overhead slap, bring the barrel down in a quick snap striking the shot bag with the barrel in as near a horizontal position as possible. Several swats are usually necessary.

I've even had good results with some vent ribs as long as the barrel was bent up or to the side. This method is also very good when it is necessary to bend a barrel to get it to pattern where you're lookin', as is sometimes required with installation of an adjustable choke.

(Note: This procedure is not for the faint-of-heart... nor should you try it for the first time on an irreplaceable or expensive barrel, for it might just not work out right for you. I've seen it done, seen the barrels that were done this way, and had it highly recommended by very knowledgeable gun men. It still worries me as a technique; use with great caution and common sense expecting a bad failure. And, celebrate your successes! Frank B.)

- Paul Smeltzer, Fresno, California

## SAVING MAGAZINE TUBES

Those junker rifle barrels can be easily turned into useful tools for removing dents from magazine tubes or, in some cases, shotgun barrels. For example, to remove a dent from a 12 ga. tubular magazine, select a rifle barrel with an exterior chamber diameter greater than the I.D. of the magazine tube. Remove the threaded portion then turn down the chamber area with your lathe to a few thousandths less than the I.D. of the magazine tube. Polish and cut a slight taper on the breech end of the barrel. You now have a very nice mandrel to iron out the dent. Cheap and complete with handle.

- Reid Coffield, Rutherfordton, North Carolina

## FORMULA FOR INDEXING WITNESS MARKS

The objective of this process is to determine the amount of material to remove from the barrel shoulder in order to bring the index or witness marks into line. It can also be used in repositioning front sights, refitting barrels, etc.

STEP 1. Find the circumference of the barrel at the shoulder.

$$\text{Circumference} = \text{Diameter} \times 3.1416$$

STEP 2. Find the number of 16th in the circumference.

$$\text{Circumference} \times 16 = \text{Number of 16th in circumference}$$

STEP 3. Find the amount in thousandths to face off the shoulder in order to bring the index marks  $1/16''$  closer.

$$\text{Pitch of barrel threads} \div \text{Number of 16ths found in Step 2.}$$



**EXAMPLE:**

Barrel Diameter = 1.250"

Threads Per Inch = 10

$$1. 3.1416 \times 1.25 = 3.927$$

$$2. 3.927 \times 16 = 62.832 \text{ (round it off to 63)}$$

$$3. .1000 \div 63 = .0016$$

*-John Snyder and staff at Colorado School of Trades, Denver, Colorado*

**SPECIAL FORMULAS FOR USE IN REBARRELING**

Here are two formulas that I found very helpful when setting back a thread on an existing barrel. The first is used to find the amount of rotational relocation of the extractor cut on a barrel; the second to find the amount a barrel shoulder must be skimmed off to line up the existing sights to top dead center.

**FORMULA NO. 1**

**Situation:** to find the amount of rotational relocation of the extractor cut on a barrel when relieving the barrel shoulder to correct excessive headspace; or, to find the location of the new top-dead-center witness-mark when relieving the barrel shoulder to correct excessive headspace; or . . .

**Formula:**

$$\text{Arc distance} = \frac{\text{thread diameter} \times \text{Pi}}{\left( \frac{\text{feed/revolution}}{\text{depth of cut}} \right)}$$

**Example Specs:**

Springfield 1903-A3

Thread diameter: 1.04"

Thread pitch per inch: 10

Barrel shoulder diameter: 1.145"

**Procedure:**

- 1) determine the depth of cut (the amount of barrel shoulder to be removed) by continuing to insert shims of known thickness feeler gage stock behind a No-Go gage, until the bolt will finally **not** close. In this example = .006"
- 2) measure the thread diameter (1.04") and multiply by Pi (3.1416) = 3.267"
- 3) divide 1000 by the thread pitch per inch (10) = .100" in-feed per revolution
- 4) divide the feed/rev (.100") by the depth of cut (.006") = 16.66
- 5) divide the circumference (3.267") by the fraction of the circumference (1/16.66) = .196"
- 6) the arc distance on the thread diameter = .196"
- 7) the arc distance on the shoulder diameter = .2159"  
(SD x Pi = 3.597" div by 16.66)



## FORMULA NO. 2

**Situation:** to find the amount of barrel shoulder which must be skimmed off in order to permit sights on a barrel to be lined-up on the action top-dead-center; or, when lapping-in a barrel for a take-down conversion so that existing TDC witness-marks on both the barrel and action will line-up together **hand-tight**, as they did when torqued-in by wrench (without changing existing headspace); or . . . . .

**Formula:**

depth of cut =

$$\frac{\left( \frac{1000}{\text{thread pitch per inch}} \right)}{\left( \frac{\text{thread diameter} \times \text{Pi}}{\text{arc distance}} \right)}$$

**Example Specs:**

Springfield 1903-A3

Thread diameter: 1.04"

Thread pitch per inch: 10

Barrel shoulder diameter: 1.145"

**Procedure:**

- 1) measure along the circumference of the barrel shoulder with a .002" feeler gage stock from the existing TDC, the arc distance needed to line-up the sight; measure this distance with a vernier caliper (or optical comparator) on a flat surface to determine the arc distance, in this case = .2159"
- 2) divide 1000 by TPI (10) = .100"
- 3) measure the shoulder diameter (1.145"); multiply times Pi (3.1416) = 3.597"
- 4) divide the circumference (3.597") by the arc distance (.2159") = 1/16.66th of a revolution
- 5) divide the feed/rev. (.100") by the fraction of the circumference (16.66) = .006"
- 6) depth of cut to be skimmed off the barrel shoulder = .006"
- 7) turn off .006"; or when lapping-in for takedown, turn off .005" and lap-in the remaining .001"

- Perry Arnett, Parowan, Utah

## VERDICT QUESTIONABLE!

Willie had built up a very fine gunshop and was about two years behind in his work. Like a lot of gunsmiths, he was inclined to say exactly what he meant in terms that left no one in doubt. A customer came in and asked for his gun months before he was supposed to and Willie told him off in such a way that he got sued and flung into court. Things were going desperately, what with Willie refusing to calm down his tongue, so to speak, so the lawyer put his mother on the stand in the hope of building up his character.



"Do you know me?" the lawyer asked Willie's mother. She replied, "Most certainly. I've lived in this town all my life and I know just about everybody who has ever lived here. I remember you from 'way back and the best I can say about you is that you are a crook!" Taken aback, the attorney asked, "Then I suppose you know the opposing attorney, too?" "I most certainly do," she snapped. "I knew him when he was no bigger than a speck - he's not only a crook, but a fool as well." At this point the judge summoned the attorney to the bench and whispered in his ear: "If you ask her if she knows me, I'll see to it you are disbarred and toss her in jail for contempt!"

- *Fred Moulton, Washington D.C.*

## RIFLE BARREL SHOULDERING

Have you ever done a beautiful job of threading and chambering a barrel, put the barrel in the vise and snugged it up with the action wrench and then the sickening realization hits you: "Oh my God, I blew it!!" Through some miscalculation or error on your part, you have faced off about a thousandth or so too much on the shoulder. That plumbers pipe cutter (fixed up with three rollers and NO cutter) will get you off the hook. Place it on the barrel at the shoulder, give a couple of tightening-up spins with quite a bit of pressure. The result will be a nice, uniformed swaged lip to the edge of the shoulder. This is generally sufficient to require the right amount of torque on the action wrench. Limit to this is about .010" and if you need more, you sure did "blow" it and had better set her back another turn.

- *Wesley A. Peterson, Charlottesville, Virginia*

## CHAMBERING FOR RECESSED BOLTS

As you know, rifles that have recessed bolt head chambers are harder to measure for headspace than, for instance, a Mauser 98. Here is an easy, accurate way if you are about to re-barrel, for example, a Remington 700. Cut the recesses, etc., and thread the shank, being sure to take a truing cut on the shank part that runs in the center rest. Screw the barrel into the action tightly and witness mark it. Remove the ejector from the bolt, also the striker assembly. Put the bolt into the rifle with the handle down.

Now take a piece of  $\frac{1}{4}$ " brass round stock, 30" long.  $\frac{1}{4}$ " welding rod is fine. Square off one end in the lathe. Make a stop collar with a screw set in it that fits the brass rod. With the barrelled action in a vise, insert the squared end of the rod in the muzzle and run it up to the bolt face tight, then run the collar up to the muzzle and tighten securely. Remove the brass rod and unscrew the barrel.



Now put the barrel in the vise, insert the rod again into the muzzle and run up to the stop collar. Call the wife and have her hold everything in place. With a depth mike on the flat end of the barrel, measure to the end of the brass rod. With this measurement you can figure absolute minimal headspace when you chamber. I always add .002" to the measurement as I don't like an air-tight fit unless the customer insists. This method is infallible. For .22 Cal. use  $\frac{3}{16}$ " rod.

- *Bob's Gun Shop, Wilton, Minnesota*

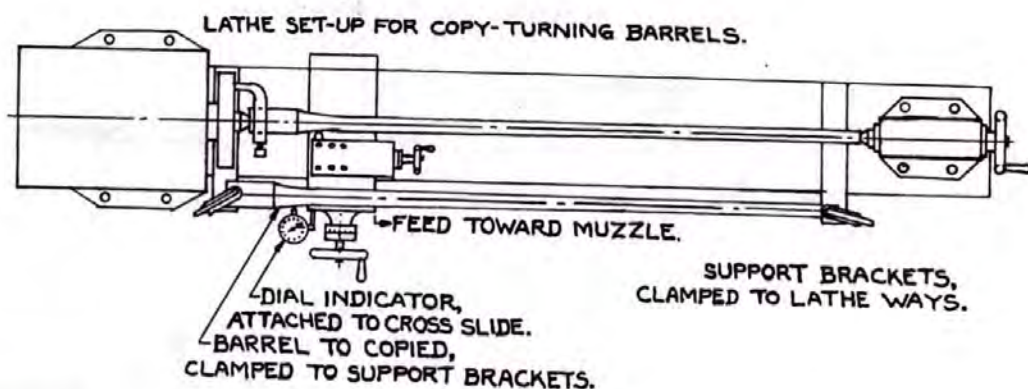
## CHAMBERING STAINLESS STEEL BARRELS

Most of the instructions on barrel fitting and chambering have been written around techniques for Chrome-Moly barrels...and they just don't work for stainless steel barrels. They require slightly different techniques. For example, normal cutting oils should not be used for stainless as they entrap chips and promote galling. Instead, light clear cutting fluids such as Tap-Free and Rapid-Tap should be used for best cutting and a mirror-smooth finish. Also, the barrel should be reamed at a higher speed, at least the first non-back gear speed on the lathe instead of the slowest speed most people recommend.

- *John Lovallo, Lynchburg, Virginia*

## BARREL CONTOUR COPYING

The enclosed drawing shows how I copy a barrel contour on my lathe. If you keep the dial indicator on zero, you should be du-



plicating the contour to within a couple of thousands of an inch. Just be sure that the dial indicator plunger is at the same plane as your tool bit.

- *Fred Gibson, Upwey, Victoria, Australia*

## CHAPPED LIP CURE

The young gunsmith was out hunting in the West, and his



guide, an old cowhand, was having lots of trouble with his lips being chapped. Finally, he swung off his horse and reached down into some fresh cow dung and smeared this over his face around his lips. The young gunsmith, being a dude, was horrified. "Man," he says, "I didn't know cow dung was good for chapped lips." "I don't know either," says the cow poke, "but it sure do keep you from licking 'em!"

- *Marion Williams, Washington D.C.*

## **.22 CALIBER BARREL LINING INSTRUCTIONS**

by **RALPH WALKER**

with additional technical information from  
**WILLIS SPRUNGER and BOB SCHUETZ**  
and the Crew at Brownells, Inc.

### **.22 Barrel Relining — Why?**

Because it frequently is the only way to save a useful, functional and otherwise fine old or shot-out gun from the scrap heap. Also, most of the classic .22 Rimfire rifles produced prior to WWII, and some models produced up to the 1960's, have become valuable collector items. Replacement barrels with the original contours and original factory markings are virtually nonexistent. This is particularly true of rifles with octagon or half-octagon barrels. Add to that all the other .22 Rimfires with defective bore, muzzle damage, chamber damage or excessive headspace, and there become hundreds and thousands of .22's needing barrel relining.

In addition, being able to provide this valuable service to your customers will introduce you to a whole new area of gun work. Factually, it is a profitable operation - one that will bring more dollars into your shop, improve your standing in the gunsmithing fraternity and keep customers from having to be turned away - or worse yet, referred to another shop for work you can provide with a minimum of investment in time and money.

### **Technical Specifications Of The Brownell .22 Caliber Barrel Liner**

**Caliber:** .22 LR or .22 Magnum. Rimfire only.

**Bore Diameter:** .224

**Outside Diameter:** 5/16" (.3125")

**Twist:** one turn in 16"

**Length; overall:** Made to approx. 30". Designed to be used on barrels 28" or less.

**Steel:** 4130 Chrome-Moly seamless drawn tubing.

**Rifling:** Shallow groove, narrow land for less bullet deformation and better accuracy.



## Tools

The tools and equipment necessary to reline a .22 barrel are both few and simple. So is the process. The only requirement is patience and pride in craftsmanship on the part of the person doing the relining and a willingness to read and follow these Instructions carefully.

1. The power source is a 3/8" electric hand drill, variable speed preferred (see "Special Notes", page 91)
2. Brownells special 8mm, .315" dia. Barrel Liner Drill with pilot.
3. A sturdy bench vise with padded jaws.
4. A good supply of Brownells Do-Drill cutting oil.
5. A squirt type can to apply the Do-Drill.
6. A chip brush to clear metal chips from the drill.
7. A standard .22 cleaning rod with bronze bore brush attached.
8. Headspace gauge for the specific .22 Rimfire cartridge you're doing.
9. "Finish" Chambering Reamer for specific .22 Rimfire cartridge you're doing.
10. Dummy ammo for the specific .22 Rimfire cartridge you're doing.

## Preparation For Drilling

1) The first step is to totally disassemble the rifle, removing all internal parts and any external parts attached to the barrel. Be sure to remove the ejector if it is attached to the side of the receiver. Thoroughly clean the barrel, especially the accumulated dirt, leading and powder residue around the chamber and in the extractor cuts in the barrel. (Clean the breech bolt thoroughly and see that the extractor is functioning freely.)

2) Next, determine if the barrel must be removed from the receiver. If you have straight, clear access to the barrel chamber through the receiver, the barrel can be both drilled and lined with the receiver attached. If not, remove the barrel from the receiver, taking care not to scar it in the process. (We recommend removing the barrel on "first" jobs and on those with complex extractor and feed ramp cuts.) Most .22 barrels use a cross pin to secure the barrel to the receiver, while others screw into the receiver. Close examination and, if available, studying an exploded drawing may help determine which method is used.

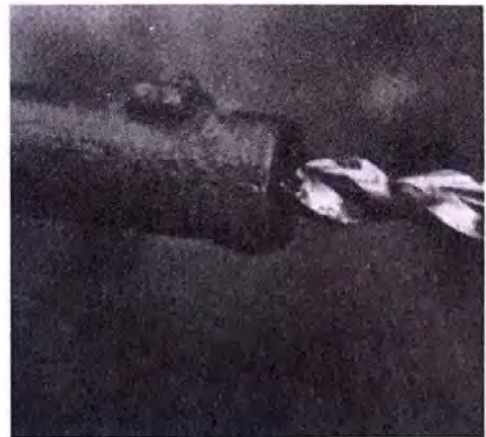
3) Examine the chamber end of the barrel closely (see Figure 1). Note where the extractor cuts are and the location and shape of any bullet guide or feed ramp. A drawing of the original chamber end of the barrel should be made as a guide for positioning the type of muzzle crown used on the original barrel - (concave, convex, counterbored, flat, stepped, etc.) will also be useful, and should be made.





**FIGURE 1** - Note severely eroded chamber. Barrel lining will eliminate this and restore accuracy. During examination, make as detailed a drawing as possible showing location and details of extractor cuts, feed ramps, bullet guides, etc.

4) The barrel will be drilled half its length from the muzzle end, and half-way from the chamber end (see Figure 2A). To make sure that the hole is drilled to the proper depth from each end and to provide a smooth joining and overlap of the two holes, measure the length of the barrel, divide by two, and then add one inch to this measurement. Transfer this measurement to the drill bit, measuring from the drill's cutting edge, NOT the pilot end. A piece of tape wrapped around the drill at this point serves as a drill stop gauge. By drilling half-way from each end, you assure maximum, accurate alignment of both liner ends and eliminate the necessity of an even longer drill shank and the problems inherent with that type of drill.



**FIGURES 2A & 2B** — Barrel is drilled SLOWLY with lots of oil, frequent chip removal and cleaning. Drill  $\frac{1}{2}$  of barrel length from each end with 1" overlap.



5) Chuck the shank of the Brownell Barrel Liner Drill into your variable speed electric hand drill and use the chuck key to tighten securely. Do not just hand tighten as the chuck will slip during drilling.

6) Finally, secure the barrel in the padded jaw bench vise. Make it as close to level as possible, parallel to the bench top. This makes holding the drill level and cutting a smooth hole much easier. On tapered barrels, you may need to lay a cleaning rod in the bore as a leveling "guide".

### Drilling The Barrel

1) Apply a liberal supply of Do-Drill cutting oil up into the bore of the barrel and also over all the areas of the drill that are going into the bore. As you cut deeper into the bore, you must keep oiling more and more of the drill's shaft. An adequate supply of cutting oil during the drilling operation is very important, and there is no such thing as too much cutting oil! (See Figure 2B.) Use a cloth or splash pan on the floor to catch oil and chips.

2) By standing directly behind the drill and viewing down, you can align, and keep, the drill straight right to left. Have a friend give instructions for up and down alignment by viewing the barrel and drill from the side, his eyes level with the bore. The extra person should not be necessary after a few barrels are done as you will learn, from the "feel" of the drill cutting properly, how much alignment is necessary.

3) The drill should *cut slowly and steadily* as it progresses through the barrel. Heavy pressure exerted on the hand drill is NOT necessary and will prevent acquiring the "feel" of the drill cutting properly. It also causes the drill to "bite" and possibly jam. The pilot on the drill will guide it through the barrel without any problem unless you push the hand drill to one side or bow the drill with excess pressure.

If, after drilling several barrels, the liner drill is not cutting cleanly and smoothly, it is probably due to a dull cutting edge. This is generally the result of an overheated drill bit and burned cutting edges caused by too much pressure or drilling too deeply before removing the drill and allowing it to cool. The cutting edge can be touched-up by lightly stoning it with an Arkansas stone. DO NOT grind the drill or alter the angle of the original cutting edge. A little stoning goes a long way, so test the drill several times during the stoning.



If the drill "Bites" too much and jams, especially with a new drill, the cutting edge of the drill may be too sharp. Using an Arkansas stone, very lightly "break the edge" of the cutting angle. Go easy on the stoning and test the drill several times during the stoning. (It must cut evenly without grabbing if you're ever to drill a 26-28" deep hole!) Also see "Special Notes", page 91.

As a general rule, the liner drill, like all drills, cuts better after some use. For this reason, and to learn the "feel" of the drill cutting properly, it is recommended that you drill two or three junk barrels before the first lining job. This usually cures the "jamming", too. Experience is the best teacher and correct barrel drilling procedure depends 50% on the operator's experience. Remember that the drill should cut slowly and steadily with only minimum pressure. Probably 90% of all drilling problems are due to too much pressure, trying to get the job done too quickly, or an underpowered drill.

4) The correct drilling technique is to drill about 1" deep, then withdraw the drill from the barrel, brush away all chips from the drill flutes and clean the bore of all metal chips with the bore brush or compressed air. Let the drill "spin free" briefly before pulling it out to help prevent the built up chips from jamming the drill. (Continuous drilling of more than 1½" - 2" without removing the drill can overheat the drill, burn the cutting edges and cause an excessive build-up of metal chips that will lead to a drill wedged up inside the bore.) Flood the hole with Do-Drill and apply some to the drill. Then drill another 1". Keep repeating this sequence until you reach the section of tape on the drill.

5) Now drill from the opposite end of the barrel in the same drill/clean; drill/clean sequence until the holes overlap.



**FIGURE 3** - Chamber end of drilled barrel. Note: Cutting oil must be thoroughly cleaned off before **ACRAGLAS**®ing.



6) Once the drilling is completed, remove the barrel from the vise and clean the drilled hole with Trichloroethane to remove any trace of cutting oil. Also clean the receiver if it is attached to the barrel (see Figure 3).

**A special note on cleaning solvents:** Do not use petroleum base solvents like gas, kerosene, mineral spirits or gun cleaners. Also, some of the newer ones like MEK won't work either as they leave a "film" or coating on the metal. If you do not have Trichloroethane available and want to use another solvent, test it first by swabbing a little of it on a clean window pane. If it leaves a completely clear window when evaporated (no fine, nearly invisible film) and will remove grease and oils, it will probably work satisfactorily for you.

### Preparation Of The Liner

1) Round the end of the liner slightly to remove any burrs and try the liner in the drilled hole. It should fit a bit tightly, but only hand pressure should be required to push it from one end of the barrel to the other. If the liner fit is too tight, run the liner drill, under power, through the barrel from both ends. If this is not sufficient, the outside surface of the barrel can also be polished until the fit is correct. Do not over-polish or the fit will be too loose. Never beat the liner into the barrel with a hammer or mallet, this deforms the liner and may jam it into the barrel. (See Figure 4A.)

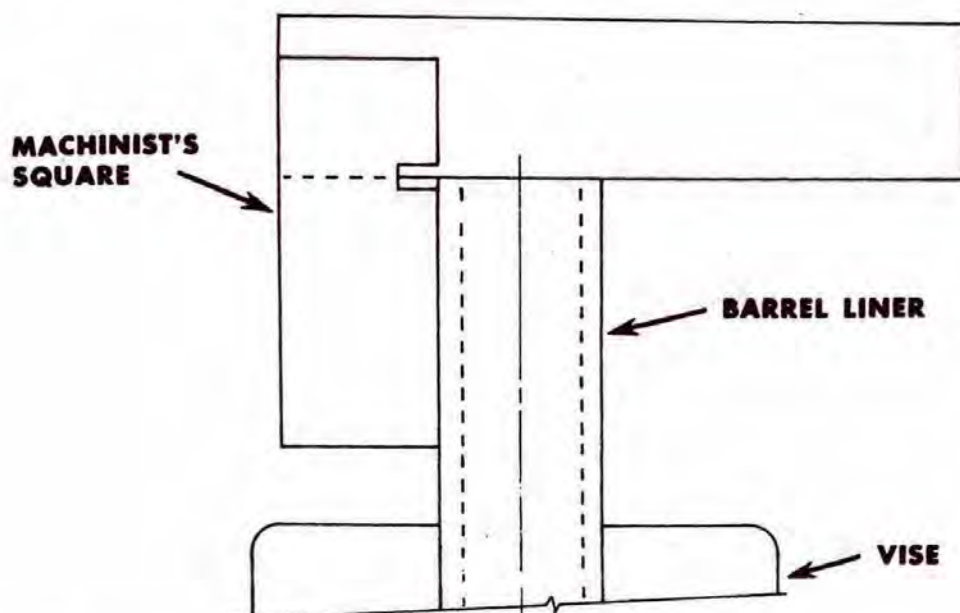


**FIGURE 4A** - Chamber end of barrel with squared-off liner in place, checking for tight fit.

2) The next step is to square off one end of the liner perpendicular to its bore. First, cut off  $\frac{1}{2}$ " to 1" from one end of the liner. This gets you past any possible damage done to the liner



during manufacture, shipment or preparations for installation. Carefully file the newly cut end of the liner square, using a machinist square or other aid against the side of the liner tube for reference. (See Figure 4B.)



**FIGURE 4B** - The end of the liner that will be at the breech end of the barrel must be squared off using a file and a machinist's square to insure accuracy.

### **Cutting The Chamber**

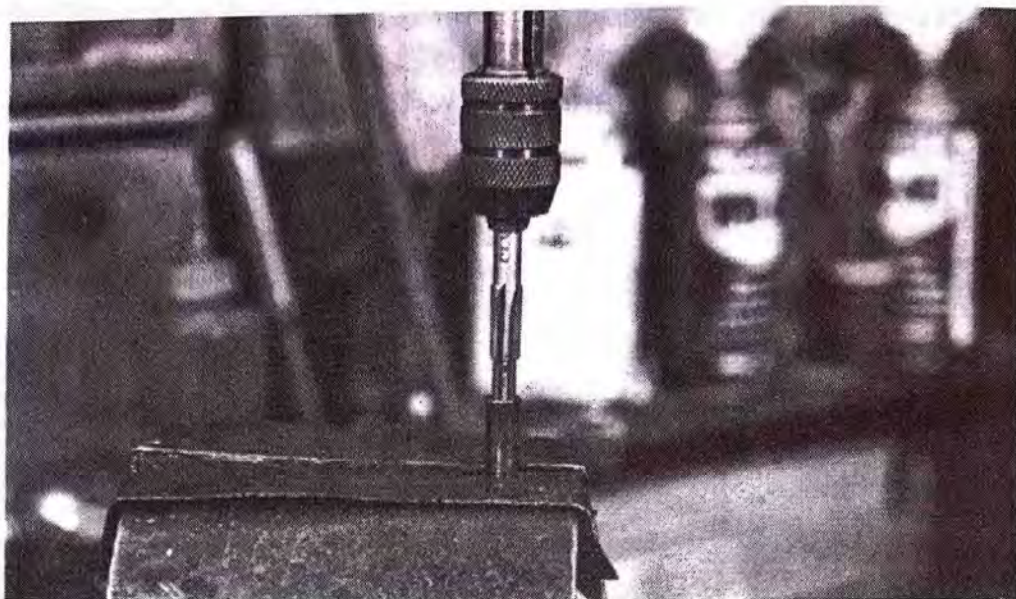
There are two basic types of chambers used on .22 rifles. **Type 1 Chamber** consists of the cartridge rim being recessed into the barrel. **Type 2 Chamber** (the most common) contains just the cartridge body in the chamber; the rim is seated into the recess machined into the face of the breech bolt.

Chambering for both types of chambers is generally much easier to do before the liner is bonded into the barrel. Cutting extractor slots, etc. is easier, too. However, there are exceptions and you must carefully look over each job before you make your decision. For instance, on those guns with a feed ramp or cartridge guide as an integral part of the barrel, the liner should be bonded first. See sections on "Extractor Cuts" and "Feed Ramps and Cartridge Guides".

#### **TYPE 1 CHAMBER (CARTRIDGE HEAD IN BARREL)**

1) Clamp the liner **ONLY** in a padded vise, straight up and down, with the squared-off end protruding about 2" above the vise jaws. Do not overtighten the vise or you will crush the liner (see Figure 5).

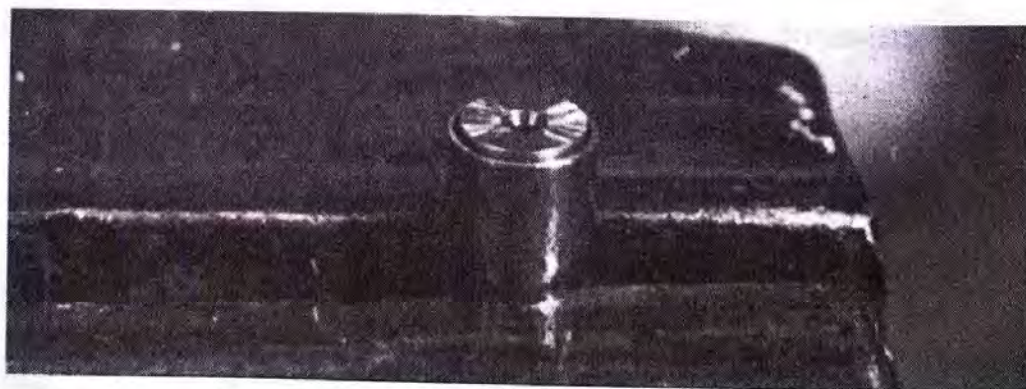




**FIGURE 5** - Liner ONLY in padded vise jaws, chambering reamer in place.

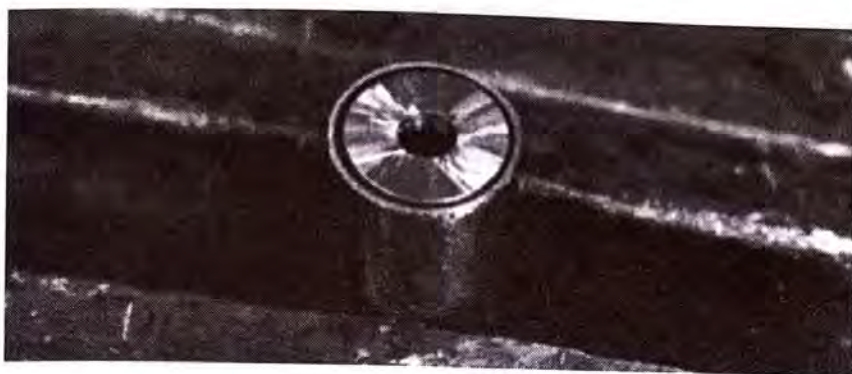
2) Cut the chamber into the liner, including the recess for the cartridge rim. Do the job by hand using a "T" -handled tap wrench to hold and turn the finisher reamer (a rougher is generally not needed). Cut slowly, use lots of Do-Drill, clean reamer and chamber often.

3) Insert the "go" headspace gauge into the newly cut chamber. Now, lay a straight edge, such as a 6" metal ruler, across the liner and headspace gauge. Any gap between the rear face of the headspace gauge and the straight edge means excess headspace. To correct, face off some of the rim of the liner. If the straight edge touches the headspace gauge and not the liner, the chamber is too shallow and must be cut deeper. Headspace is correct when the straight edge touches both sides of the liner and also touches the rear face of the headspace gauge (see Figures 6 & 7).



**FIGURE 6** - Headspace gauge in place - chamber too shallow.





**FIGURE 7** - Headspace gauge in place - chamber depth correct. Note thin rim of liner left around Headspace gauge in Type 1 Chamber.

4) When the chamber has the correct amount of headspace, take the liner out of the vise and push it through the barrel from the muzzle end until rim edges are flush with the rear face of the barrel. Use only hand pressure; do not tap or force the liner for you will damage the newly cut chamber rim if you do. This "flush-rear" position must be maintained when locating the extractor cuts and during bonding in order to maintain correct headspacing. You may wish to make fine index marks on the barrel and liner to ensure correct repositioning of the liner after each removal.

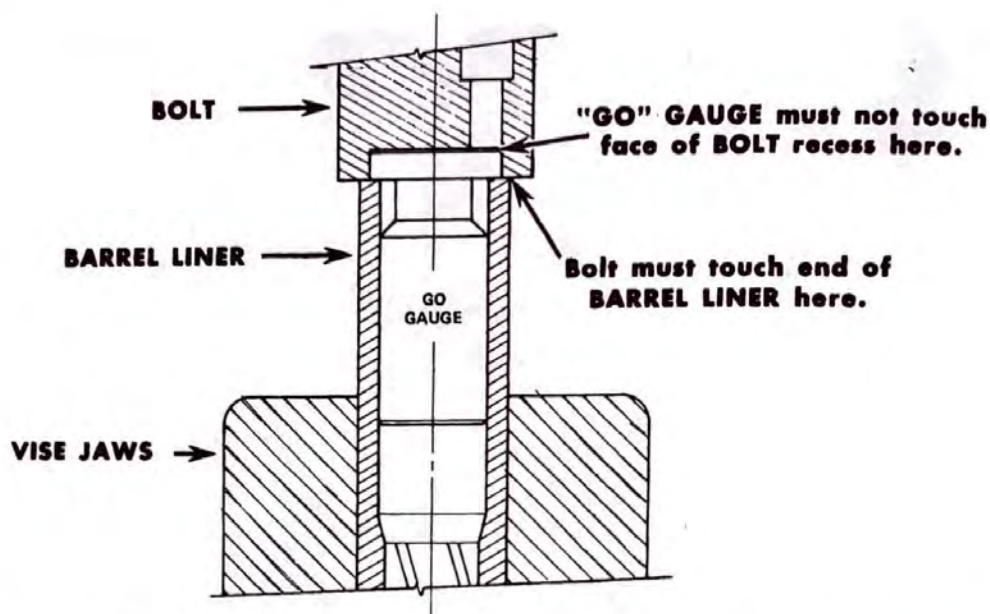
## **TYPE 2 CHAMBER (CARTRIDGE HEAD IN BOLT FACE)**

1) Clamp the liner **ONLY** in a padded vise, straight up and down, with the squared-off end protruding about 2" above the vise jaws. Do not overtighten the vise or you will crush the liner (see Figure 5).

2) When cutting a **Type 2 Chamber** in a liner, it is only necessary to cut until the rim section of the finisher reamer touches the face of the liner. (Rougher is generally not used.) Cut slowly, use lots of Do-Drill, and clean often.

3) With the liner mounted vertically in the vise, insert the "go" headspace gauge in the newly cut chamber. Place the breech bolt, with the extractors removed, on the end of the liner. (See Figure 8.) By close examination under a strong light you can determine if the rim recess in the bolt is correct. If the face of the bolt does not touch the liner, first examine the rim recess in the bolt face to see if there is any "crud" keeping the bolt from seating correctly. If the bolt recess is clean, then your chamber is not deep enough, and must be cut deeper.





**FIGURE 8** - Bolt positioned on top of the liner with "go" gauge in place. End of the liner contacts the bolt, while the rear face of the headspace gauge **Does Not!**

Go slowly, cutting only .001" at a time and check with the headspace gauge and bolt after each cut until the bolt face touches the barrel liner edge as described above. Use Do-Drill and clean after each cut. This additional depth will cut a shallow rim recess in the barrel liner itself, and must be done so that the bolt's forward movement during loading is stopped by the rear face of the lined barrel, not the cartridge rim. If the rim stops the bolt, additional pressure on the bolt can cause the cartridge to fire before the bolt is fully closed and/or locked.

If the rim recess in the liner is cut too deeply, excessive headspace will result. This can be corrected by lightly filing the rim edge you have just cut into the liner.



**FIGURE 9** - Large extractor cutout requires bonding liner in barrel before making cutout.



## **Extractor Cuts**

As mentioned earlier, extractor cuts are best done prior to bonding. Instructions for making extractor cuts on both **Type 1** and **Type 2 Chambers** are covered in this section. The exception is on single shot rifles where the extractor takes up a considerable area of the rear of the liner. With this type of extractor, first bond the chambered liner and then cut away the liner a bit at a time until proper clearance for the extractor is achieved (see Figure 9).

### **TYPE 1 CHAMBERS (CARTRIDGE HEAD IN BARREL)**

1) In **Type 1 Chambers** with small extractor cuts, push the liner forward until it is flush with the face of the original barrel. Using a sharp scribe, carefully mark the location of the extractor cuts, checking your marks against the drawing you made.

2) Remove the liner and carefully make the necessary extractor cuts in the liner. Needle files work very well for this, but any other method that cuts cleanly and precisely will work. Reinstall the liner in the barrel.

3) Reinstall the barrel on the receiver; reinstall the extractors; and, holding the liner in place with your hand, insert a dummy cartridge in the chamber and work the action to be sure it will extract the cartridge. It's easier to correct problems now than after the liner is bonded into the barrel.

### **TYPE 2 CHAMBERS (CARTRIDGE HEAD IN BOLT)**

1) Follow steps 1 & 2 above.

2) Reinstall the extractors on the breech bolt and, with the liner in place in the barrel, check to be sure they will extract a dummy cartridge from the chamber in the liner.

3) Reinstall the bolt and barrel on the receiver. Holding the liner firmly in place with your hand, insert a dummy cartridge in the chamber and work the breech bolt through its full cycle to be sure it will extract the cartridge. Make whatever corrections are necessary now, before you bond the liner in the barrel.

## **Feed Ramps and Cartridge Guides**

On barrels where a feed ramp or cartridge guide is an integral part of the barrel, the drilling operation will cut away part of the



ramp or guide. This must be replaced. The unchambered liner is slid out past the breech end of the barrel until the rear edge of the liner mates with the fresh cut on the feed ramp. Bond in place in this position. The portion of the liner which replaces the drilled away section of feed ramp must now be filed to match the contour of the original feed ramp. The rest of the liner is filed to match the existing breech face. Now chamber, headspace and cut extractor slots.

### Bonding the Liner

There are two common ways to bond the barrel liner to the drilled barrel - soft solder or epoxy. Soldering has been around for a long time and can be difficult and time consuming to do. The epoxy method is relatively new, beginning in the early '60's. Ralph Walker, Walker Arms, Selma, Alabama started **ACRAGLAS**<sup>®</sup> barrel liners in place in 1963. Liners installed then are still in everyday use, and not a single one has come loose. In fact, one barrel, relined in 1964, has been immersion hot blued twice without liner separation. Because it is so much easier to do, and has been very successfully done for many years, we will discuss **ACRAGLAS**<sup>®</sup> barrel liners first.

### BONDING WITH ACRAGLAS<sup>®</sup>

1) Thoroughly clean the hold drilled in the barrel and the outside surface of the liner with Trichloroethane to remove all traces of oil. **ACRAGLAS**<sup>®</sup> will not bond on an oily or waxed surface. Lay the liner on a clean surface and mount the barrel in the vise, breech or muzzle end up, tipped slightly from vertical. (See "Special Notes" Page 91 for more comments.)

## STOP

Before proceeding, look at the gun you are working on carefully. If you have followed the steps to this point, the liner is fitted and ready for installation in the barrel, and the barrel is back on the receiver. Read over the section following, looking at the rifle in your hand and think through what you will do and how you will do it; where the extra **ACRAGLAS**<sup>®</sup> is going to go; and how you're to clean it up. Then decide if you want to leave the barrel attached to the receiver or not. Some guns cause no problems. Others - those with fully enclosed bolts, very small ejection ports and no way to get at the breech face of the barrel - simply must be disassembled before attempting to put the liner in place.

2) Next, thoroughly coat all surfaces on the receiver and breech bolt with **ACRAGLAS**<sup>®</sup> Release Agent, RIG or paste wax. While the release agent is drying, assemble all the things you will



need to mix, cool, apply and clean up the **ACRAGLAS®**. These specific supplies include:

2.1) .22 caliber cleaning patches or similar, approximately  $\frac{3}{4}$ " square. Anything bigger will tend to squeeze the **ACRAGLAS®** out of itself as it enters the bore and prevent you from getting a good, even coat of **ACRAGLAS®** inside the barrel.

2.2) A .22 caliber rifle cleaning rod with a slotted tip.

2.3) A throw-away acid brush, or other small brush, for applying **ACRAGLAS®** to the outside of the liner. (It must be stiff enough to adequately apply the cold **ACRAGLAS®** which gets to be about the consistency of cold syrup as it is chilled).

2.4) An old T-shirt or similar clean material that can be torn into two or three rags and used to wipe up **ACRAGLAS®** runs and spills. Do Not use paper towels, bench wipes or such that will stick in the **ACRAGLAS®** rather than clean it up.

2.5) A bottle of regular cooking vinegar. We prefer white; but have no reason for recommending it other than it seems to be readily available and doesn't smell quite as bad as the good old fashioned cider type. All work equally well in removing **ACRAGLAS®** that is still in the liquid state. We know of no other chemical or solvent that is as readily available or works as well as the acetic acid in vinegar for removing a noncured or "kicked over" **ACRAGLAS®**. It will not work once the **ACRAGLAS®** has started the cure cycle and is no longer fluid.

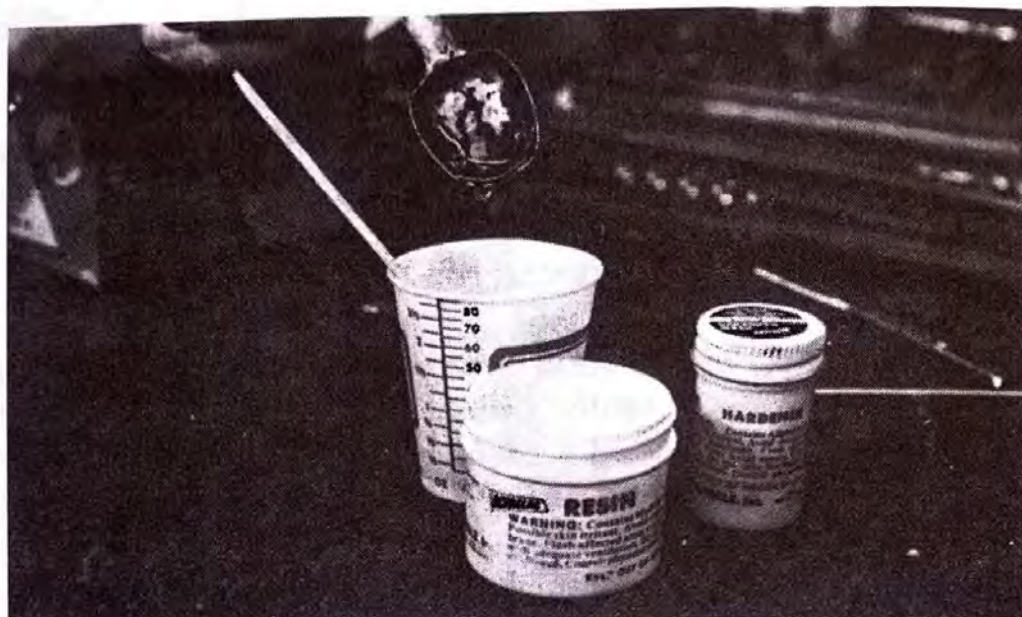
2.6) A small wood block to protect your hand when pushing the liner into the barrel.

2.7) A small container to hold ice water to cool the **ACRAGLAS®** and extend its pot life and your working time. We found a small plastic container ideal; anything will work, however. Just remember to keep the ice water level well below the level of the top of the **ACRAGLAS®** mixing cup, and all water and ice out of the **ACRAGLAS®** itself.

2.8) A pair of tight fitting rubber gloves to keep you from getting **ACRAGLAS®** on your hands, and to keep you from possible aggravation of any skin allergy to the petro-chemicals from which **ACRAGLAS®** is made.



3) Mix the **ACRAGLAS®** according to the instructions with the kit, leaving out the floc and walnut stain (see Figure 10). You may



**FIGURE 10 - ACRAGLAS®** kit comes with everything needed, mix according to Instructions but leave out the Floc and brown stain.

wish to use Epoxy Black coloring; however, the **ACRAGLAS®** line is so thin it is not really required. (Generally about 1¼ oz. of mixed **ACRAGLAS®** is more than enough. You may wish to mix more for the first two or three liners you do, "just to be sure" until you know what your usage will be.)

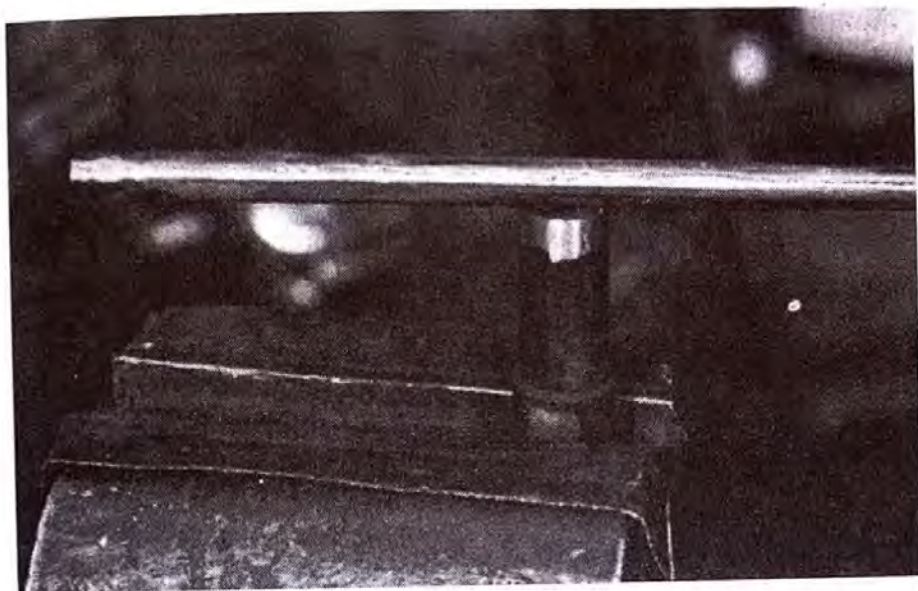
Next, place the thoroughly mixed cup of **ACRAGLAS®** in the pan of ice water prepared above. Be careful to keep water out of the **ACRAGLAS®** as it can contaminate it and prevent it from hardening correctly.

4) Wipe down a .22 caliber rifle cleaning rod and slotted tip with Trichloroethane and insert a clean .22 caliber cloth patch (or similar) in the slotted tip of the cleaning rod. Dip the patch in the **ACRAGLAS®** and run it through the barrel from one end to the other. Before pulling the rod back through the barrel, remove the **ACRAGLAS®** patch, for if you pull it back through, you will simply wipe off the **ACRAGLAS®** you just applied. Recoat the patch and repeat this application step two or three times to insure a good, heavy coating of **ACRAGLAS®** inside the barrel.

5) Thoroughly coat the outside surface of the liner with **ACRAGLAS®**. We found a small acid brush ideal for doing this job. (See Figure 11). It is extremely important that all surfaces to be



bonded receive a good coating of **ACRAGLAS®**. It is always better to apply too much rather than not enough. Note: Be sure you have Release Agent on all surfaces you do not want to **ACRAGLAS®** together.



**FIGURE 11** - Liner coated with **ACRAGLAS®**, ready to install.

6) Insert the liner in the barrel. There are two ways this can be done. (See "Special Notes", Page 91.)

**From The Muzzle End:** (Our preferred method). Insert the "go" headspace gauge in the chamber, or plug the end of the liner with modeling clay if it is unchambered. Start the chamber end of the liner into the muzzle of the barrel and push the **ACRAGLAS®**-coated liner up into the barrel until it nears the breech end, using a block of wood in your hand to keep from injuring it on the liner's muzzle end. Meanwhile, with your free hand, hold an old T-shirt or other rag at the breech end of the barrel and catch the **ACRAGLAS®** being pushed out of the drilled barrel ahead of the liner as it comes up from the muzzle. The amount of **ACRAGLAS®** pushed ahead of the liner is usually quite small. Most of the excess is scraped off the liner as it enters the barrel. We placed a cardboard box on the floor below the vise and caught this excess as it ran off.

**From The Breech End:** (Use this method only with the barrel removed from the receiver). Plug the muzzle end of the liner with modeling clay to keep **ACRAGLAS®** from getting into the liner. Be very careful handling the chamber end of the liner so as not to damage or distort the rim edges, etc. You might want to insert the



"go" gauge (coated with release agent) to protect the new chamber and give you a pushing surface. Push the liner in with one hand while holding a clean rag around the breech end of the barrel. This will catch most of the **ACRAGLAS®** that scrapes off the liner as it pushes down through the chamber end of the barrel and out the muzzle. You will have a tremendous amount of runoff at this point, and you must be very careful to thoroughly clean all the runover **ACRAGLAS®** out of the threads of the barrel, along the barrel itself and so on, before allowing it to set up.

## STOP

Vinegar and a soft cloth can be used to wipe off thin films of **ACRAGLAS®** from barrel faces, headspace gauges, out of extractor slots, etc. This must be done while the **ACRAGLAS®** is still liquid. If set up, vinegar will not remove it.

7) Use a soft cotton cloth thoroughly soaked with household vinegar to clean up any spills, runs or excess **ACRAGLAS®** from the barrel, threads, end of the liner, the cleaning rod and tip and anywhere else you may have gotten it. (It also works extremely well to clean up your hands). Leave a "donut" of **ACRAGLAS®** around the muzzle end of the liner to insure a clean, filled joint between the liner and the barrel once the **ACRAGLAS®** sets. You may need to add this "donut" just as the **ACRAGLAS®** in the ice water is finally beginning to "kick over" in order for it to stay in position and not run out. The chilled **ACRAGLAS®** will give you from 45 to 60 minutes during which to move and adjust the liner in the barrel. (We found we had plenty of time, and normally took the still "unturned" **ACRAGLAS®** out of the ice water long before it had started to thicken enough to prevent any additional movement.) If you did not ice the **ACRAGLAS®**, you will have only about twenty minutes total time from the first mixup to the initial kickover when the **ACRAGLAS®** is no longer fluid. We do not recommend that you ever attempt to **ACRAGLAS®** bond a barrel liner without slowing the "kickover" time of the **ACRAGLAS®** by cooling it in ice water. You simply run the risk of not having enough time to do the job correctly and it is not worth taking that risk.

8) If you have disassembled the gun in order to put in the new liner, now is the time to reassemble. Clean up the barrel breech face thoroughly and all other **ACRAGLAS®** spills or runs. Reassemble the barrel to receiver.

9) With the gun assembled and the liner in the exact position you want it to remain in, close the breech bolt, taking care that



the extractors are fully engaged on the headspace gauge. Set the gun or barrel in a rack, muzzle up, and place a weight on the end of the liner. The weight assures that the liner is pushed fully to the rear and that proper headspace is maintained. This step also takes up any excess headspace due to a loose breech bolt as the weight pushes the breech bolt back against its locking surface. **Special Note:** On rifles such as semi-automatics, where the breech block is held forward only by spring pressure, the weight placed on the end of the liner should only be sufficient to push the liner back until it fully engages the breech block with the breech block in its most forward position. You may want to put an index line around the liner to be sure you have not put on too heavy a weight and pushed the liner further out of the barrel than it is supposed to be.

10) Allow the **ACRAGLAS®** to "kickover" and fully cure before removing the weight. Allow a minimum of 24 hours and **Don't Rush It!**

11) When the **ACRAGLAS®** has cured, remove all Release Agent from the receiver and the breech bolt. Any excess extruded **ACRAGLAS®** can be cut away with a sharp knife blade. Install a dummy cartridge and check for proper extraction.

12) If a new extractor is to be fitted, it should be done now. With the new extractor positioned in the extractor cutout, use the chambering reamer to cut correct clearance and fit for the cartridge rim in the extractor. (See Figure 12).



**FIGURE 12** - Liner bonded, new extractor being fitted using chambering reamer to cut proper case body and rim clearance in extractor.



## BONDING WITH SOLDER

1) Follow the same basic procedures for drilling the barrel, checking the headspace and cutting clearance for extractors, feed ramps, etc. The same factors all apply.

**Solder:** We recommend Brownells Hi-Force 44 Solder because of the high silver-to-tin content, its superior holding qualities, ease of application and resistance to damage from hot bluing. Use Dyna-Flux with Hi-Force 44.

**Heat Source:** Normally one propane torch puts out enough heat to successfully tin the liner. But, to tin the barrel - and to insert the tinned liner into it, you will have to use 2 propane torches. This means a helper will have to play one torch over the barrel while you work with the other and also insert the liner. **DO NOT** use Oxy-Acetylene to tin or solder. The flame is sooty and will quickly contaminate the solder or steel to the point that you cannot successfully flux, tin or solder.

2) The first step is to "Tin" the outside of the liner with solder. Thoroughly degrease and lightly sand the outside of the liner. Clamp the muzzle end of the liner between 2 blocks of wood in a vertical position in your bench vise, chamber end up. Try to have all the length of liner needed exposed for ease in tinning. (With an approximately 30" long liner and no more than 28" usually needed, you will have about 2" to clamp into the vise). If you cannot tin the entire length without moving the liner in the vise, be sure not to swap ends. Keep the chamber end up, but just slide the liner down through the blocks and vise and continue tinning the liner sticking below the vise. If you flip ends, you'll have a ridge of solder where the 2 solder sections meet that can make inserting the liner difficult.

Apply a liberal amount of flux to the liner's surface. The flux will clean the surface and also float away any impurities during the application of the solder. (Caution: the flux is a very aggressive cleaner. It can cause surface rust/corrosion quickly on uncoated/unprotected metal, including the surfaces of your vise. Use with care.)

3) Apply heat to the liner until it will melt the solder applied to it. (The liner metal must melt the solder, not the heat source.) The molten solder will "run" and cover a large area of the liner. While the solder is still in the molten state, wipe the liner surface



with a clean soft cloth. This removes the excess solder and leaves the liner coated or "tinned" with a thin film of clean solder. Do not handle this "tinned" surface with your greasy hands; it will contaminate the surface and can keep the solder from bonding properly.

4) Next, the drilled hole in the barrel must be tinned. Mount it the same way you did the liner; in the bench vise, chamber end up. Dip a wire-bristled bore brush (mounted on a cleaning rod) into the flux and run it through the barrel several times. Apply heat to the outside of the barrel until the solder placed on the INNER drilled surface will melt and run into the hole. (You will need 2 propane torches to supply enough heat.) The entire barrel must be heated sufficiently, from muzzle to chamber, to keep the molten solder running the full length of the drilled hole. Use the fluxed bore brush to spread the solder until the hole is completely tinned over its full length.

5) Thoroughly flux the newly tinned liner over its entire surface. Plug the chambered end of the liner with modeling clay and start that end into the drilled hole in the barrel at the muzzle end. While applying heat the full length of the barrel with the 2 propane torches, begin gently tapping the liner up into the hole. The barrel must be kept hot enough over its entire length to keep the solder molten for the liner to slide into the hole. Correctly done, the solder on the liner and the solder in the drilled hole will melt and fuse together, securely bonding the liner and barrel together when they cool.

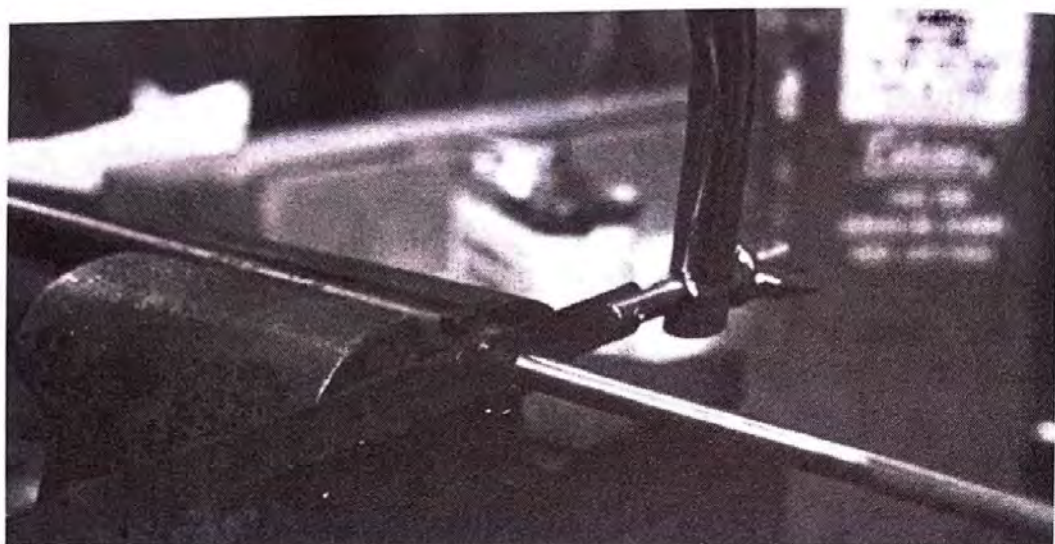
6) The heat necessary to properly solder the barrel liner in place will cause very rapid oxidation (rusting!). You must apply a good coat of light machine oil to both the inside of the liner and the outside of the barrel as soon as they cool from soldering. (Brownells "Pro-Tek" is an excellent non-additive mineral oil to use.)

### FINAL FITTING & CLEAN-UP · ALL METHODS ·

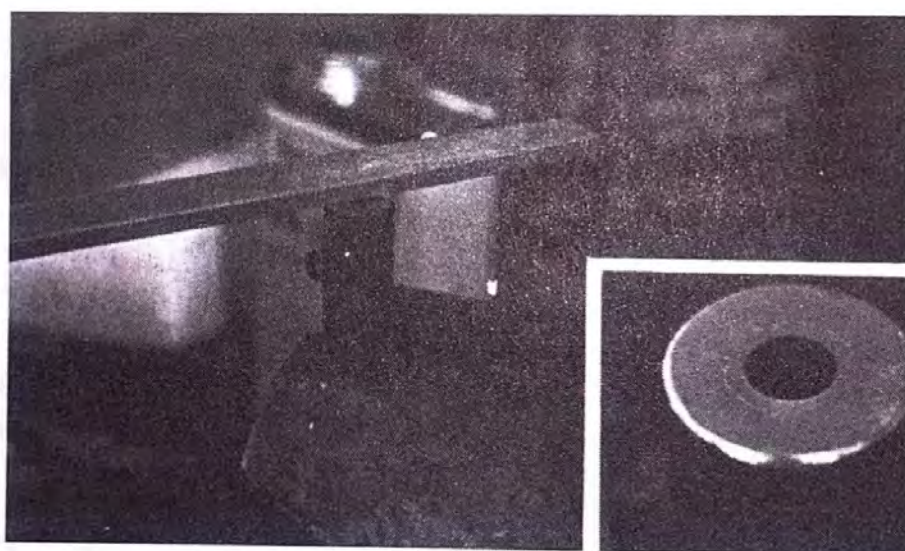
1) Cut the liner off at the muzzle with a hacksaw, leaving approximately 1/8" of excess liner showing. File the liner down until it is flush with the muzzle (see Figures 13A & 13B).

2) If the barrel had a convex or concave type crown, this is





**FIGURE 13A** - Hacksaw off excess liner.



**FIGURE 13B** - File flush and square with muzzle (see inset).

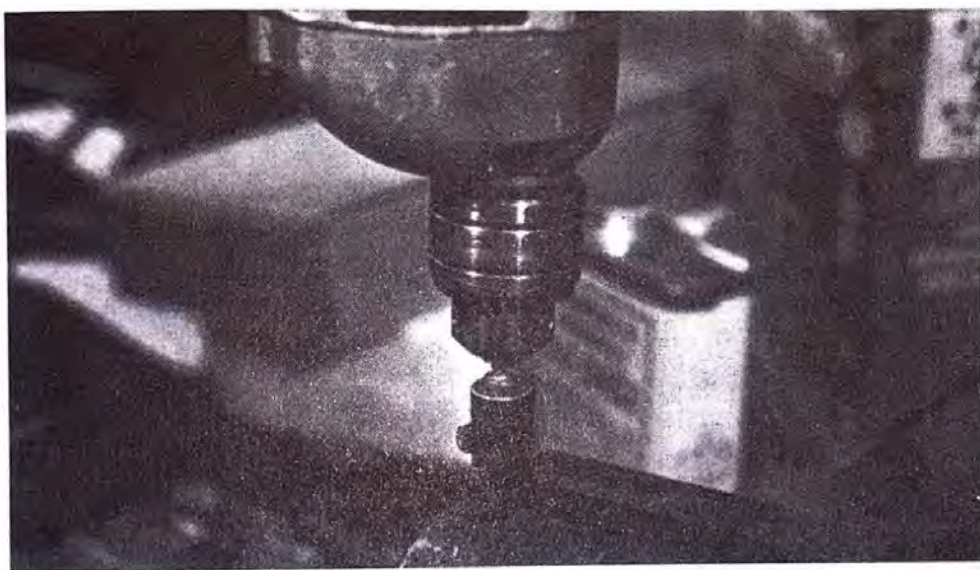
best cut on a lathe, but the job can be done by hand with a special tool you can make in your shop. Chuck an appropriately sized piece of drill rod into your electric hand drill (or drill press), and with the drill running, file the rod until it matches the shape of the original crown. Coat the end of the shaped rod with fine grinding compound and, keeping a layer of compound between the head and the liner, lightly grind away the edge of the liner until it blends in with the original crown.

On barrels where the muzzle is flat, simply file the liner until it matches the original barrel. Finish up by using a large, roundhead brass bolt or screw chucked in your electric hand drill with fine



grinding compound between the bolt head and the liner (see Figure 14). All that is necessary is to lightly grind away the edge of the liner using the rotation of the bolt to assure uniform metal removal.

When shaping a crown, it's a good idea to plug the bore about  $\frac{1}{2}$ " down from the end of the tube with a cleaning patch to prevent the chips and filings from dropping into and collecting in the bore of the new liner. When work is done, patch can be pushed out from other end with a cleaning rod.



**FIGURE 14** - Crowning the new liner using a roundheaded brass bolt coated with fine grinding compound and mounted in an electric drill. Lightly bevel the inside edge of the new liner to blend with the original crown.

3) With care, the liner will blend in with the original barrel and be almost invisible. Touch-up Blue can be applied to both the muzzle and the chamber end of the liner to help in matching finishes if the barrel is not to be reblued. As previously stated, **ACRAGLAS®** bonded liners can be run through a regular immersion, hot blue without the liner coming loose.

4) The final step is to clean everything up, finish reassembling the rifle, check headspace once more with the "go" gauge (see Figure 15) and test fire to assure correct functioning.

### **RELINING PISTOL AND REVOLVER BARRELS & CYLINDERS**

Relining pistol/handgun barrels follows essentially the same procedure as used for relining rifles. However, you must carefully





**FIGURE 15** - "Go" gauge in place for final check fit before test firing. Breech block should close easily but snugly on the "go" gauge.

look over the gun you are proposing to reline to be sure that 1) it is worth the work, 2) the condition of the barrel and cylinder are otherwise safe to be used for shooting; and 3) you understand the loading and firing function fully so that in relining the barrel you get all the necessary feed ramps, extractors-ejectors, etc., accounted for in the relining. Above all, be sure you know and understand what the relining is going to remove, what it will leave, and how safe the relining job is going to leave the handgun.

### **SEMI-AUTO PISTOLS**

Semi-Auto pistol barrels follow the same relining procedures as those used on relining rifle barrels. Most semi-auto pistol barrels use a feed or bullet-guide ramp, and the cartridge head is usually recessed in the face of the breech bolt.

### **REVOLVER BARRELS**

Relining revolver barrels also uses the procedure used in relining rifle barrels. You must watch to be sure that the end of the liner is flush with the breech end of the original barrel so that the cylinder will turn without binding. Also, the liner should be lightly chamfered as was the original barrel to guide the bullet leaving the cylinder neatly into the bore.

### **REVOLVER CYLINDERS**

.22 Caliber Revolver Cylinders can be relined, also using the



same procedures as in relining barrels. You must check to be sure enough wall material will be left in the cylinder after drilling it out to accept the new liners. All rifling must be removed from the cylinder liners in front of the chamber area once the liners are in place. *This is best done with a .22 throating reamer.*

### **WILLIS SPRUNGER ON. . . DRILLING THE BARREL ON A LATHE**

We asked Willis Sprunger of Pitzer Gun Shop, Winterset, Iowa, to write about how he made a long extension drill for drilling out .22 barrels; and how to do the drilling on a lathe. Willis did a real nice job of covering that, and also sent along comments on **ACRAGLAS**<sup>®</sup> in the liner, time requirements, some tuning up tips once the liner is in and other interesting and very useful suggestions.

We've tried to include everything that's new or different, or not already been covered by the other 2 instruction sections.

### **MAKING A DRILL**

The drill I used on this job is just an ordinary Chicago Latrobe 5/16" bit, with a pilot ground on, the shank drilled 1/4", and a 24" piece of cold-rolled silver soldered into the hole in the shank. I have tried pull reamers with oil feed and the push drills with three cutting edges and oil feed (which push out the chips with oil) and the gun barrel drills with "V" grooves and oil feed. I have also tried using a drill without a pilot ground on the end. . . Disaster Guaranteed using that drill, so DON'T!!

### **DRILLING THE BARREL ON A LATHE**

1) Remove barrel from rifle and mount on your lathe, centering to the bore, not the outside of the barrel. (We will not go into further details here - too many variables from size of lathe to amount of taper on barrel to be discussed. The presumption is that you know how to operate your equipment so as to be able to do deep drilling. BB.)

2) Using the appropriate boring bar, bore the chamber end of the barrel to the diameter of your liner (O.D. .311 to .3125") to a depth of 1/4" to 1/2". This will give the cutting part of the drill a start so it won't catch on an extractor slot when you start drilling.



3) Place the tool post so that it is exactly on center line with the barrel's bore. Clamp the drill shank about 6" behind the point in the tool post (you'll have to design your own clamp; and long flute drills may require a different one). Check to be sure that everything is lined up properly and set spindle and carriage to desired speed (recommend 600 RPM) and feed (recommend about .002" per revolution).

4) With a pump oil can, give 1 or 2 squirts of Do-Drill Cutting Oil down the bore and on the drill and engage the feed. Place a small block of steel about 3/8" ahead of the carriage and when the carriage reaches the block, back out the drill, brush off the chips and give bore and drill another squirt or two of Do-Drill.

5) Move the carriage back up to the block of steel, reset the block another 3/8" ahead and drill out another 3/8" of the bore. (With a drill with longer flutes you may be able to go further without cleaning out the chips.)

6) When the tool post clamp is about an inch from the end of the barrel, slide it back on the drill shank 6 or 7" and continue the drilling process. You can continue until you are completely through the barrel; or you can drill in only half-way, switch the barrel end for end and drill the other half. (That way you won't have to drill quite so deeply.)

7) Take the barrel out of the lathe and degrease it thoroughly, both the drilled out bore and the outside.

8) Cut about 1" off the end of the liner to be sure to get rid of any possibly damaged rifling and polish a slight taper on that end. Measure the barrel to determine the length of liner needed and add 2" to that figure. Beginning at the newly cut and polished end, measure off the amount of liner required, and cut off. Finally, plug the polished/tapered end with a wooden plug, tapered to fit snugly, but not too tightly.

9) You are now ready to bond with **ACRAGLAS®** or solder.

### COMMENTS

1) When **ACRAGLAS®**ing the liner in, coat both liner and inside of drilled hole in the barrel thoroughly with **ACRAGLAS®**. Starting from the receiver end of the barrel, slide the plugged end of the



liner in first and push it through the bore. Keep a ring of **ACRAGLAS®** at the breech as the liner goes in to be sure not to have any voids at the chamber end.

2) Actual drilling time is a little over an hour. Chambering, crowning, cutting extractor slots and installing liner takes about another hour. Charges are usually for time plus cost of the liner.

3) When test firing - especially on an older gun - be sure to check the condition of the firing pin. Poor ignition may well be cured by chisel-pointing the old firing pin, or even replacing it.

### **BOB SCHUETZ ON. . . SOFT SOLDERING THE BARREL LINER IN**

We asked Bob Schuetz, SGW, Inc., Olympia, Washington, to put us together some instructions on how to correctly solder barrel liners in place for those in the fraternity who still prefer to bond liners in place with soft solder. Bob succeeded admirably in the task, and his instructions follow.

### **TINNING THE LINER AND BARREL**

1) After drilling out the rifle bore, check to be sure that the liner will fit. Clean the outside of the liner with 180 grit emery paper. When the surface is smooth, the liner should slide into the drilled bore of the barrel with a minimum amount of force.

2) Thoroughly clean and degrease the barrel and liner with Trichloroethane (or equivalent) to remove all cutting oil, grease and other krud. See comments on cleaners in first part of instructions.

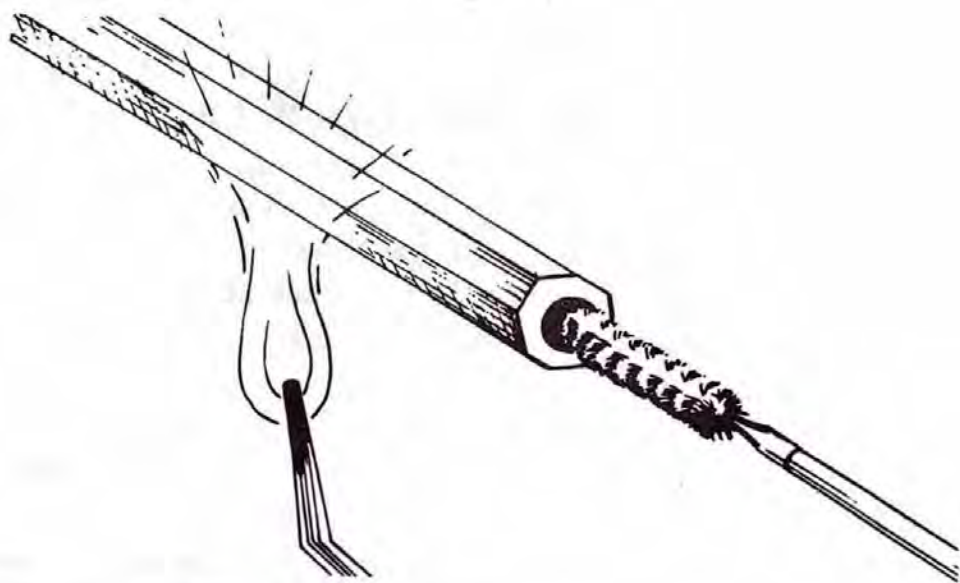
3) Hold the liner securely by one end with a set of wood blocks in your bench vise, and tin the surface of the liner. Wear a pair of heavy gloves, like a pair of welder's gloves. Saturate a very small piece of #00 Steel Wool in the Dyna Flux and rub the outside of the liner thoroughly. Work from the vise on out to the end of the liner.

4) Heat the liner with a torch until the Brownell Hi-Force 44 solder you are using melts and flows when touched to the liner not directly under the flame. Apply the solder directly to the liner, and using the steel wool you applied the flux with, wipe the solder down the full length of the liner. Be sure to maintain the temperature to get a good even coverage.



5) Next, tin the inside of the barrel. Using either a brass or aluminum rod fitted with a .32 caliber brass bore brush, wrap a small wad of 00 steel wool around the bore brush. It clings well, and makes a bore brush a solid mass. Dip the brush into the Dyna Flux and apply liberally to the inside of the barrel. When the entire barrel is heated to the working temperature of the solder, apply solder to the breech end of the bore and keeping the barrel hot through its entire length, spread solder inside the bore with the steel wool swab you made for applying the flux. Continue melting solder into the bore and swabbing it around until you have a good even coating on the entire inside surface. If the swab and rod hang up on you in there, you don't have the barrel hot enough, and you must apply more heat.

It would be to your advantage to make a fixture that would hold the barrel while tinning and relining. The rod or swab will hang up frequently in the barrel if the barrel is not brought up to the proper working temperature. (See Figure 16.)



**FIGURE 16** - Barrel must be kept hot while applying solder to prevent brush from sticking.

### JOINING BARREL & LINER

1) Be sure that both liner and barrel are brought back to the working temperature of the solder and held there. Liberally flux both outside of liner and inside of barrel again. Touch a little more solder to each piece and heat until flows the same on both pieces.

2) Start the liner into the breech end of the barrel with the



muzzle pointed downward. Melt a little solder where the liner is entering the barrel at the chamber end. This will feed down through the full length of the barrel and liner because both pieces are up to temperature and both surfaces are tinned.

3) Once the liner has slid into position in the barrel, secure the heat, but be sure to stay right with the barrel-&-liner to see that the liner does not slip either up or down or around inside the bore until the solder has cooled.

4) After barrel-&-liner have cooled down, you can trim the ends of the liner in preparation for chambering.

### Special Notes and Other Considerations

*(Ed. Note: This section of the Instructions is to cover, in an informal manner, all the aside information, comments, bits and pieces, and so on that come to light while drilling, bonding and finishing barrel lining jobs. New "Kinks" and info will be added as it comes up, and we welcome hearing your suggestions and comments for inclusion in this section of future instruction booklets.)*

1) In lining .22 Rimfire barrels, we discovered as I'm sure many of you have, that many .22 barrels are not straight. For your own amazement, check out a few to see just how crooked many of them are. Therefore, it is the accuracy of the barrel that is important...not its "straightness".

2) Drilling the hole in the barrel for the barrel liner with a piloted drill can be as easy or as hard as you want to make it. We found that a 3/8", variable speed, electric hand drill would work if you are extremely patient. However, most 3/8" drills we have had experience with do not have enough torque to do the job with any kind of speed or ease. After trying a number of electric drills, we found a fixed speed (560 RPM), heavy duty, 1/2" drill with a 5 amp draw that worked beautifully for us. It simply sat there and ate its way through the barrel at an extremely rapid rate, making it a very easy operation. A lighter weight drill constantly "jammed" the bit into the hole and did not have the torque necessary to break all the chips free and continue cutting. We also found the Skil 1/2" "Extra Tool" with the "Hammer Drill" feature to be very helpful in breaking tough chips free. Whatever drill is used, you must use a great deal of Do-Drill cutting oil to prevent damage to



the drill, and you must clean out the chips frequently. We found an M16 brush did the job ideally.

3) If the bore of the original barrel being drilled out is slightly undersized and the pilot on the piloted drill you bought from Brownells does not enter, do not attempt to drill this barrel with that particular drill. A new drill with a properly sized pilot must be either obtained or ground. (Brownells does have a slightly undersized piloted drill available upon special request). This undersize bore has shown up in a few older guns or even a particular model or model year of any particular gun; you'll have to be aware they exist and watch for them.

4) In mounting the barrel in the vise prior to **ACRAGLAS<sup>®</sup>**ing the liner in, there are many options and many ways you can go each with its own advantages and disadvantages. Please do follow the discussion closely, and hopefully, we can save you some grief and mess.

Realistically, the barrel can be mounted in the vise breech up or down, vertically or horizontally and at all the angles in between. After trying many different angles, we finally decided that we preferred an essentially vertical position with a 20 to 30 degree angle to one side. As for whether to insert the liner from the breech end or the muzzle end: We found no real advantage one way or the other, except that it seemed to be easier and much cleaner if we mounted the barrel in the vise with the breech end up and inserted the liner from the muzzle, sliding up towards the breech. (Leave enough room between the end of the barrel and the floor to get the liner started.) This method of insertion pushed a small ring of **ACRAGLAS<sup>®</sup>** ahead of the barrel liner. The excess **ACRAGLAS<sup>®</sup>** on the outside of the liner was scraped off as the liner entered the muzzle end of the barrel and ran down into a cardboard box on the floor. However, you can insert from either end, using just about any technique you like. The whole secret is to get the excess **ACRAGLAS<sup>®</sup>** out of your way with a minimum amount of mess on you, the bench, the gun, the floor and so on.

*- All the folks listed at the beginning of these instructions.*

## THE TRADE

A few months ago a couple of local characters traded guns with each other at a nearby gun show. This was well against their better judgement, seeing as how they have known each other since school days. From then on they both grumbled about how they got "took" and how they shoulda known better than to have traded



with the "D" crook. One day over a cup of coffee I asked Charlie, one of the swappers, how come he and Joe didn't trade back the guns they'd traded each other for in the first place and end the feud. "What the H--L", Charlie exploded, "and let that b---d screw me again? Never!"

- *Bob B.*

## SPINDLE GUIDE

I have a 1" hole in the spindle of my lathe and when I need to bore out a .22 barrel I use one of your trued inserts for the felt wheels. I take the insert and bore it to about muzzle diameter, slip it on the muzzle, slide it in the spindle and chuck the chamber end. The insert doesn't mar the barrel and holds the barrel quite nicely.

- *Willis Sprunger, Winterset, Iowa*

## NON-SHOWING .22 BARREL LINING

When doing a barrel lining job I use the longest drill bit available and weld it to a rod. Then, when drilling out the barrel, I take the drill out every 1/2" or so to clean and relubricate it. When I get down to the muzzle, I don't drill through but stop just short of it so the liner will not show. The rough drilled hole is just fine as it helps hold the Acraglased liner in place. Finally, I grind off the end of the barrel liner to the same contour as the drill for a perfect fit at the muzzle.

- *Martin List, Norborne, Missouri*

## EXTRACTOR RECESS FOR BARREL RE-LINING

When relining .22 rifle barrels and finding it difficult to sketch or remember how the extractor recess looked on the old breech face, simply press the old breech into some clay (or use Acraglas, using release) and Presto! a perfect image that you can copy on the new breech. This idea is probably as old as time itself, but it sure did help me.

- *W.W. Dengler, Danbury, Connecticut*

## SQUARING OFF BARRELS

When cutting shotgun barrels without the benefit of a lathe, and trying to get a straight cut by hand, you can have problems. Cut barrel(s) off as straight as possible, and then place barrel between two "V" blocks with cut end just protruding from ends of blocks - barrel vertical, of course. Now, with a file carefully file end of barrel flush with blocks... this works on both shotgun and rifle barrels. "V" blocks have deep Vees on one side and shallow on the other to handle a wide variety of diameters... (Note from Bob B.,



just to show that great minds run in the same channels, this Kink was sent in by two 'Smiths.)

- *Daytona Gun Repair, Daytona Beach, Florida*

- *Bucks Gun Repair, Beauford, South Carolina*

## **"BLACK" GLASS IT INSTEAD OF SOLDER**

Here is a tip that I would like to pass along. I color Acraglas with your Nigrosene Black dye and use it in place of solder. I have used it to finish off a double barrel shotgun after bluing and it looks a lot better than solder, probably will last a lot longer, too. I also stick sights on with it all the time.

- *Darrel Harrison, Sunburst, Montana*

## **MY HOBBY**

A hobby is something you go crazy over to keep from going nuts.

- *Bob B.*

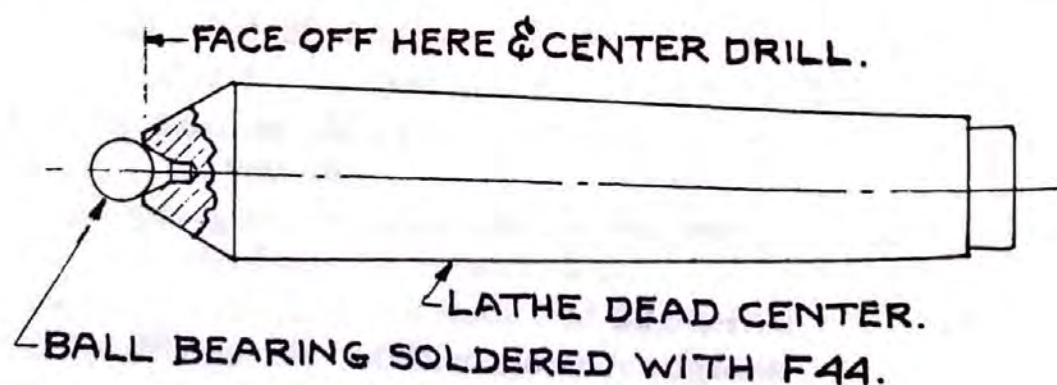
## **ACRAGLAS FOR DOUBLE BARRELS**

Acraglas used for joining muzzle-loading double shotgun barrels together does a fine job. The barrels will never get too hot because of the time consumed in reloading.

- *A.C. Davis, Brownstown, Illinois*

## **BARREL CROWNING WITH LATHE**

A lot of the boys around here had muzzle breaks put on their rifles, then later wanted them off. That caused me to come up with another dodad such as a ball bearing soldered on the end of my



USE 1/4" BALL FOR SMALL BORE  
& 5/16, 3/8 & 7/16 FOR OTHERS.

lathe dead center. I use a 1/4" ball on small bores, 5/16, 3/8 and 7/16" on most everything up to 8mm. Choose a ball size that will



use only about 1/3 of the ball. You can use emery cloth, but you gotta watch for wrinkles. I prefer compound with light pressure and change ball centers often.

*-J.D. Allen, Dallas, Texas*

## MUZZLE CROWNING WITH AN EMERY WHEEL

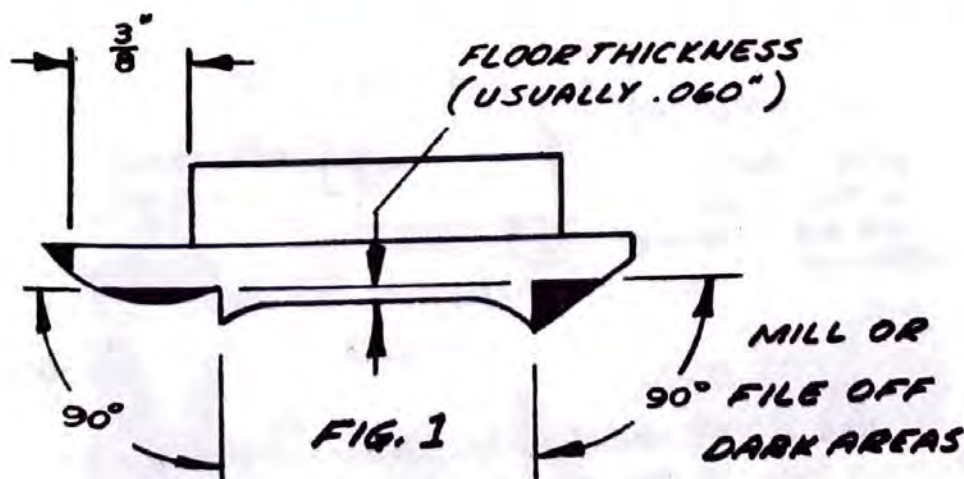
An emery wheel point such as Dremel's No. 921 or 922 does a real good job of crowning a barrel. Much better and faster than the old brass ball method.

*-Jim Brush, Summit Lake, Wisconsin*

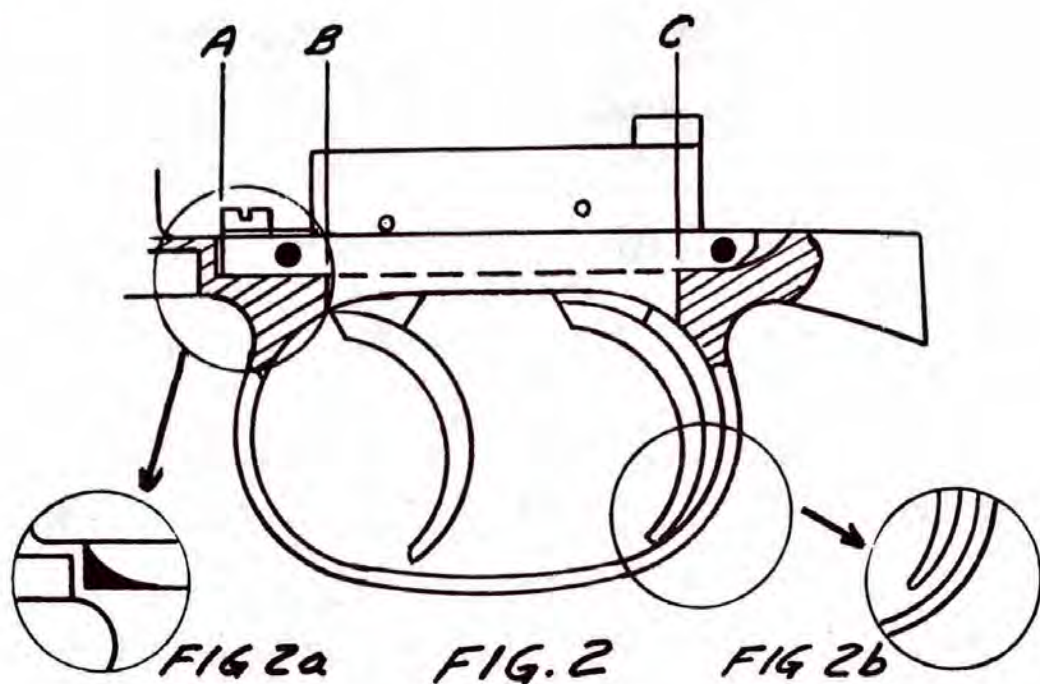
## INSTALLING M-98 DOUBLE SET TRIGGERS

The double set trigger (DST) for the Model '98 Mauser comes assembled and includes a loose new kick-off piece. Pulling the rear trigger cocks the front trigger. Then a light pull on the front trigger releases the rear trigger, causing an upward blow on the kick-off cam, which operates the sear bar, overcoming the sear bar spring and releasing the sear and firing pin. The front "trigger pull" is actually sear engagement, and the amount of pull is controlled by the small screw between the triggers. When the front trigger is used alone (un-set) the trigger pull is heavy, determined by the sear bar spring and the reduced leverage of the front trigger. The earlier model Mausers require alterations to the DST body, the trigger guard (TG) and the kick-off piece.

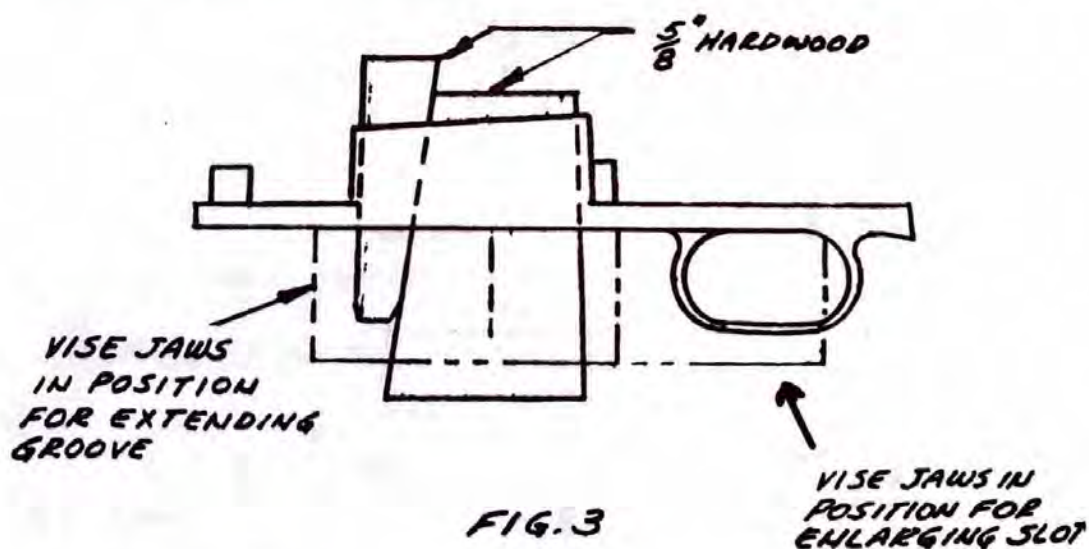
The action should be checked for burrs or machine marks and smoothed on the cocking piece, its sear, the underside of the action where the kick-off piece bears and the top surface of the kick-off piece. Disassemble the DST and coat with layout dye the body and the TG behind the magazine to facilitate marking. The dye is helpful - use lots of it. Mark the DST body as indicated in Fig. 1, and mill or file off the surplus metal. Re-assemble the DST and







clamp beside the TG as shown in Fig. 2. Note that the TG groove will need to be extended forward (Fig. 2A) and that the rear trigger may need to be ground to fit the shape of the TG (Fig. 2B). If a milling machine is used, a 1/4" end mill will extend the groove forward (Fig. 2A) and pierce the floor plate for the enlarged trigger slot. File-fit the corners of the DST body to the radii left by the end mill. If a file-and-chisel system is used (and it works well) begin by making wedges of 5/8" hardwood to insert in the magazine well to clamp solidly in the vise. Put several layers of masking tape on the inside bottom of the TG bow and the top of the vise jaws to prevent scratches.



Grind a 1/2" chisel to the groove width for the finish cuts. Remove most of the material with a 1/8" cape chisel, taking off



light peels of metal, then finish the removal with the re-ground 1/2" chisel. **BE SURE TO WEAR SAFETY GLASSES.** Use the narrow chisel and a NEW 4" mill bastard file, ground safe on one edge, to enlarge the trigger slot to the new size, checking with in-letting blue as you go. It doesn't take long unless the chisel is dull and the file is worn out.

When the DST is inletted into the TG to your satisfaction, mount it with two 1/16" dia. cross pins. Brownell's .063" spring wire makes a nice pin and is just enough oversize to allow polishing to fit. Be careful of the drilling, since the tapered sides of the TG may cause the drill to run out if care is not used. The approximate pin locations are shown in Fig. 2 as dark circles.

Assemble the new kick-off piece into the sear bar, cock the firing pin and open the bolt about 30 degrees. The firing pin should remain cocked. The clearance between the bottom of the sear bar and the top of the forward lip of the kick-off piece should be reduced or eliminated by installing an adjusting screw. Remove the kick-off piece and drill a #31 hole through the lip, as close as possible to the forward edge, not quite breaking through. Then tap the hole 6 x 48. The tap will bulge the forward face of the lip. The lip can be pinched slightly in a vise to give a tight fit for the 6 x 48 adjusting screw.

Assemble the action and TG with the DST. Be sure to use the tubular stock bushing on the rear action screw. Cock the firing pin and try the DST. In most Model '93 actions, the triggers will not

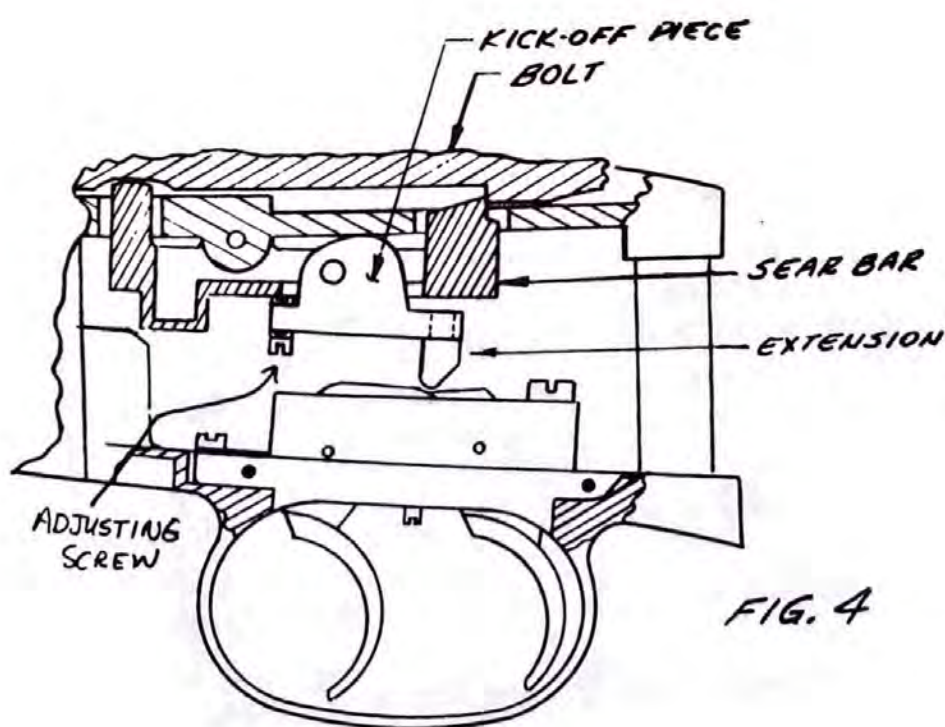


FIG. 4



reach the projection of the kick-off piece, so it will not release the firing pin. Measure the gap and make an extension piece as shown in Fig. 4. Drill rod works well and a piece can be "lathed" to shape using files and a drill. The tip of the extension is first fitted to the forward trigger, then to the rear. Be SURE to use the stock bushing on the rear action screw during fitting. When all is in order, silver solder the extension on, or get your local jeweler to do it. The Mauser sear spring is pretty stiff and may need to be carefully shortened to about 9/16" to eliminate some of the pre-load before the trigger will function. Check that jarring the gun will not fire the trigger when set, and adjust the small screw between the triggers to suit. To "un-set" the trigger, open the bolt and draw back part way. Pull the front trigger. The gun should not be set until on target.

- *Dan Plamondon and The Crew at Brownells*

## THE URGE TO CAUSE GRIEVOUS BODILY HARM DEPARTMENT

The local town Know-It-All, who never makes a mistake, came into the gunshop the other day and was nosing around, offering lots of ill-timed advice to the harried gunsmith. It just so happened that the gunsmith had just finished welding a bolt knob on, and the completed bolt and knob were aside on the bench to cool. Mr. Know-It-All wanders over, picks it up in his bare hands, and then puts it down about 147 times faster than he picked it up. The gunsmith, figuring the man was finally about to get his comeuppance said, "What's the matter, burn your hand?" "Nope," says Mr. Know-It-All, "it just doesn't take me very long to look at a bolt knob."

- *Jack Williams, St. Joseph, Illinois*

## IMPROVING THE BOLT WELDING JIG

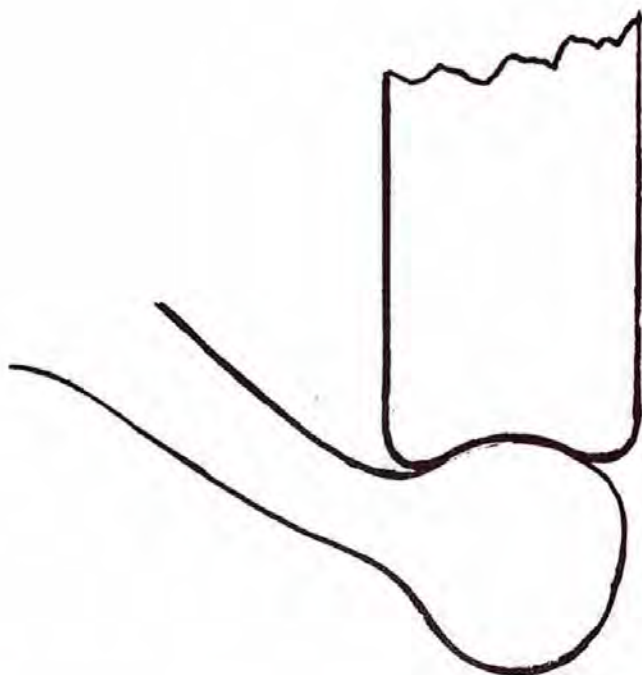
I've been using one of your bolt welding jigs for years, but with a slight modification the boys might be interested in. The lower V block which holds the bolt knob was cut off at 90°, or at least the V portion was cut out. Then I aligned the face up with the set screw and then center punched it. At this point I drilled it to a depth of 3/16" with a .500" drill. This method not only holds the knob much more securely but also makes it much easier to align with the bolt body. Try it sometime and I think you will be more than pleased with the results as the hole gives you a 360° bearing surface!

- *W.T. Christian, West Walton Beach, Florida*



## POLISHING THE LENARD BROWNELL BOLT KNOBS

My recommendation for using my bolt handles is to contour a felt wheel as per sketch, then charge with 150 compound and polish the knob free of all surface marks before welding. With a



wheel of this shape, it is easy to remove whatever metal is necessary to get rid of the blemishes from the cast surfaces without distorting the shape of the knob. If the bolt is to be checkered, here again it is easier to do that before welding.

- Lenard M. Brownell, WYARNO, Wyoming

## STOCK FILLER FOR ABRASIVE PASTE

I couldn't find my abrasive paste one day to clean up the threads on a M93 Mauser bolt after bending the handle. But, I had some Casey Stock Filler that was handy and used it instead. Worked just fine and after cleaning up the parts they worked good and smooth.

- Dan's Gun Shop, Shickshinny, Pennsylvania

## CHECK THE CHOKE FIRST

I have learned one thing the hard way (with our reamer system of opening chokes) after some 10 years of doing it as you do. ALWAYS put a dab of cold blue on the inside of the muzzle before starting the reaming. If it does not blue you have a plated bore. Use the hone to remove the plating and on a little to the rear (chamber end) of the choke. Then scrub it good with bore cleaner to remove the abrasive before using the reamer....I've had



several gunsmiths tell me this is not necessary and believed them until I hit my master - it just rounded the edges of the reamer.

- Gary Thiry, Sacramento, California

## TRAINING THAT DOG

A young man bought a hunting dog pup, and because of one thing and another, the pup got grown up without any proper training. Come hunting season however, he took it out, and lo and behold, it could point and retrieve like crazy. So, when duck season rolled around, he took it out and it could retrieve ducks like out of this world. Wanting to show his fabulous dog to his hunting buddy, they got up and out to the blind early one morning and got all set. A duck came over, the buddy shot it and the dog tip-toed out across the water, picked up the duck, brought it back and set it at the master's feet. After a bit the proud owner says to his buddy, "Hey, Perc, didn't you notice anything unusual about my dog?" "Yea," allows Perc, "summabitch can't swim, can he?"

- Harold Kohler, Kennewick, Washington

## LONG FORCING CONE WARNING

Be careful when contemplating doing a long forcing cone job on some of the older shotguns, particularly the Browning over-and-under. There just isn't enough steel there to take care of the extra metal removal. The .410 is real bad, so is the 28 gauge. You also have to be very careful with the 20 gauge.

- B. McDaniels, South Lyon, Michigan

## POLY RIB INSTALLATION

When installing them, I put the rib into the rib holding fixture and instead of the old sandpaper method, I get my new Brownells portable sand blast gun out and blast the black finish off the bottom of the rib. It does a perfect job and cleans all the black finish off fast and easy!

- Leon Smith, Redding, California

## REVOLVER FORCING CONE CHAMFERING

### Introduction

The Brownell Revolver Chamfer Tool Kit was designed with the assistance and cooperation of noted professional pistolsmith, Ron Power, whose many years of building some of the finest PPC guns in the U.S. brought invaluable experience and expertise to the project. Until the introduction of this Kit, tools for this type of work were almost impossible to obtain commercially, and even the



most proficient pistolsmiths seldom had chamfering tools of such excellent design and high quality. In addition, while the forcing cone is a very critical and sensitive area in the modern revolver, and greatly affects accuracy and reliability, it has not been well understood by the shooting public. So, little has been written on how to correct the problems that are directly traceable to faults in forcing cone design or function.

With these very detailed and complete instructions - plus the Brownell Revolver Chamfering Tool Kit and the other accessories - you can now very confidently make forcing cone work an important part of the service you offer your customers and a profitable part of your operation. You'll be very pleased with the results you can achieve.

**NOTE:** *We urge you to read all of these instructions carefully and thoroughly prior to doing any work. You will be dealing with a critical area of the revolver; there is little room for error. Be careful!*

### **The Forcing Cone Function And Significance**

Although forcing cones are found in one form or another in almost every modern breech-loading firearm, it is of no importance whether the revolver is single action, double action, .22 rimfire or .44 magnum. The forcing cone, or barrel throat, always functions in the same manner and is of extreme importance to the safety, reliability, and accuracy of the revolver.

The forcing cone is located at the breech end of the barrel immediately in front of the cylinder. It can be thought of as a "funnel" or internal taper at the beginning of the barrel. The function of the forcing cone is to guide the bullet into the bore after it has left the cylinder. The forcing cone may vary in length up to 3/8" or more and the angle of internal taper may range from less than 1° to 45° or more.

It is interesting to note that tho' modern firearms manufacturers employ some incredibly sophisticated and advanced production techniques, for all practical purposes, it is still impossible to produce a revolver in which all six chambers of the cylinder will align themselves perfectly with the bore of the barrel under all conditions. As a revolver is used and develops wear on various parts, the alignment of the individual cylinder chambers with the barrel bore will deteriorate. Under certain conditions, this mis-alignment can progress to a dangerous condition.

In the more extreme cases, the cylinder chamber will be so far out of alignment with the barrel bore that the bullet will hit the



side of the barrel as it leaves the cylinder. It will then "skid" into the bore and continue on down the barrel; certainly not conducive to good accuracy!

In some instances, part of the bullet, especially lead bullets, will be forced from between the cylinder and the barrel. This is often referred to as "spitting" or "shaving" lead. It is dangerous to the shooter as well as to bystanders. As you would expect, the potential accuracy of a revolver that suffers from this condition is greatly diminished, for not only is the bullet deformed prior to its entry into the bore, but bullet weight is no longer consistent as well.

Firearms manufacturers long ago developed the forcing cone as a means of compensating for cylinder-to-bore misalignment brought about either by wear on the various parts of the mechanism or by inconsistency in the manufacturing process.

It has only been within the last few years that the significance of the forcing cone as an element of revolver accuracy has begun to be fully realized. The growth of PPC competition, and the demand for greater accuracy in revolvers, has played a major role in focusing more attention on the forcing cone because a well-designed and constructed forcing cone allows for the smooth entry of the bullet into the bore. The goal is to have minimum bullet deformation which, in turn, will lead to greater accuracy. In addition, a properly constructed forcing cone aids in minimizing lead build-up or "leading" in the bore. Again, this causes less bullet deformation, more uniform pressures and contributes significantly towards greater accuracy.

### The Brownell Revolver Chamfering Tool Kits

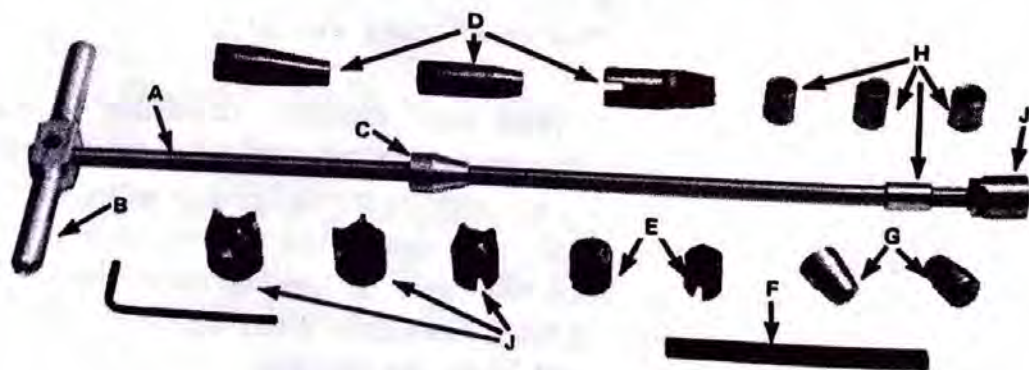


FIGURE 1 - Complete Centerfire Kit

The Brownell Revolver Chamfering Tools are available as individual items and in a variety of kits. Let's begin by examining



each tool in the Complete Gunsmith's Chamfering Tool Kit and its particular function.

The Extension Rod, ("A", Fig. 1) made of high-strength stainless steel is approximately 11-1/2" long and is threaded at one end to accept a variety of cutters and laps. The other end has a small flat area, milled into one side approximately 1/8" from the end. This milled area was designed to provide a locking surface for the tool handle.

The Handle ("B", Fig. 1) is secured to the Extension Rod by a small Allen set screw. A 3/32" Allen wrench is also provided. (One note of caution at this point. It is NOT necessary to apply a great deal of pressure to the Allen screw when attaching the handle to the Extension Rod. Make it snug and then stop. You don't want to strip out the screw threads.)

An Aluminum Center Guide ("C", Fig. 1) is provided to both protect the muzzle of the barrel from possible damage by the Extension Rod and to insure that the Extension Rod is centered in the bore. It is utilized by sliding the guide onto the Extension Rod so that its tapered portion will extend down into the bore during use. The Extension Rod is then inserted through the barrel from the muzzle end.

The Chamfering Cutter ("D", Fig. 1) is threaded onto the Extension Rod after the appropriate Brass Pilot is in place. Three Chamfering Cutters are provided: an 18° Cutter for 9mm to .41 caliber barrels; an 18° Cutter for .44 caliber to .45 caliber barrels; and an 11° Cutter covering all calibers from 9mm to .45. The 18° chamfer has been used quite often by firearms manufacturers, and in most instances, will provide a slight accuracy advantage when

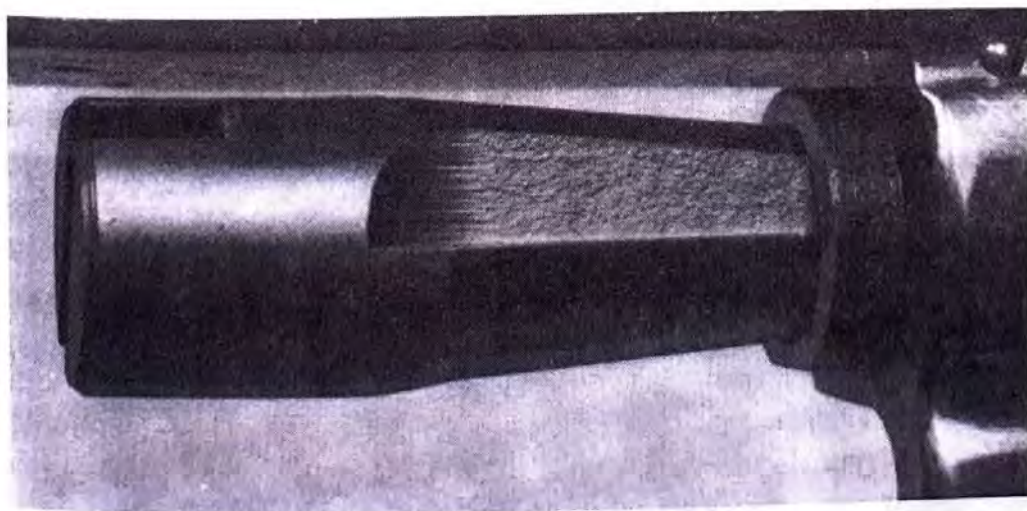


FIGURE 2 - 11° Cutter positioned in barrel throat.



shooting jacketed bullets. The 11° Cutter was designed by Ron Power after extensive research and experimentation during which Ron found that the 11° chamfer provided optimum accuracy when using hollow-based lead wadcutter bullets, the type most often used in PPC guns.

Additionally, two 82° Cutters ("E", Fig. 1) (9mm to .41 caliber and .44 to .45 caliber) are available to slightly chamfer the inside edge of the rear of the forcing cone. These Cutters are used only after the forcing cone has been cut. Their function is to break the sharp corner that may be present on the inside edge of the barrel chamfer. **DO NOT** use the 82° Cutter to form a compound angle forcing cone. Test results have shown that this is detrimental to good accuracy.

The Breaker Bar ("F", Fig. 1) is provided for use as an aid in removing the various cutters from the Extension Rod. Slots are provided in the end of each cutter for its use. **DO NOT** attempt to remove cutters with pliers or vise grips. Doing so risks almost certain damage.

Brass Laps ("G", Fig. 1) in various calibers are available for those gunsmiths who wish to polish or lap the chamfer cut. After the final cut has been made, the proper Brass Lap is attached to the Extension Rod and an abrasive such as the Clover Silicon Carbide Paste is used to coat the lap. The Extension Rod is then rotated in a *clockwise* direction while the lap is pulled into the chamber. Normally, very little (if any) polishing is required.

The Brass Pilots ("H", Fig. 1), which are available in four sizes (.38, .41, .44, and .45), are very desirable accessory items. By utilizing a Brass Pilot, you can in many instances, recut or realign off-center forcing cones. The Pilot will also aid in insuring that the Chamfering Cutter is in proper alignment with the axis of the bore during use in the installation of new barrels. It is mandatory that a Brass Pilot be used when utilizing a 90° Facing Cutter.



FIGURE 3 - 90° Facing Cutter - Note clearance between Cutter and top strap



The 90° Facing Cutter ("J", Fig. 1) is used to square up the breech end of the barrel. This is especially useful when fitting a new barrel to a revolver. The use of the Facing Cutter can make this job faster, easier and much more precise. By the way, it is just the ticket for removing "high" spots on the barrel which may interfere with the rotation of the cylinder.

The 90° Facing Cutters are available in four diameters: .450, .560, .625 and .687. You should use the Cutter whose diameter just exceeds the diameter of the end of the barrel extension. It should never be smaller than the diameter extension. Ideally, it should just exceed the diameter of the barrel extension while not being so large that it contacts any point on the inside of the frame.



FIGURE 4 - Plug Gauges

The Barrel Chamfering Plug Gauges (see Fig. 4) are additional accessory items that are very helpful. Available in four sizes: .22, .38, .44 and .45; these precision ground, hardened steel gauges enable you to accurately measure the width of the chamfer and ensure that you never remove too much metal from the barrel extension.

### Using The Tools

*Begin by making sure that your revolver is not loaded.* While it is not necessary in most cases, the removal of the cylinder from the gun will make your work easier and faster. You may also wish to remove the grips and place the butt of the revolver in a suitable padded vise so that your hands will be free. The barrel can be in almost any position; horizontal, perpendicular or vertical. Place it in the position that is most comfortable for you.

It is a good idea at this point to lay a clean shop cloth through the cylinder opening in the frame in order to catch any stray metal chips, drops of cutting oil, lapping compound or any other debris that may be removed from the barrel. You should also run a cleaning patch or two through the barrel to remove any excessive oil or



fouling prior to beginning any work.

Loosen the set screw and place the Chamfering Tool Handle on the Extension Rod. The Handle should be secured to the non-threaded end of the rod in such a manner that the set screw in the Handle enters the small flat milled area on the Extension Rod. Tighten the set screw until the Handle is secured. **DO NOT** -- repeat **DO NOT** -- over-tighten the set screw. You may strip the threads from the Handle.

Place the Center Guide on the Extension Rod so that the tapered portion is pointing away from the Handle. Now the Extension Rod can be inserted through the barrel from the muzzle end. This should be done carefully. The Center Guide should then be pushed forward so that the tapered portion enters the barrel bore.

If you have a Brass Pilot of appropriate caliber, it can be slipped over the threaded end of the Extension Rod and gently slid into the bore of the barrel. It will provide an additional aid in aligning the Cutter and the Extension Rod with the axis of the bore.

A Chamfering Cutter can now be threaded onto the Extension Rod. Position the Cutter against the threaded portion of the Extension Rod with one hand so that by turning the Extension Rod Handle with your other hand in a *clockwise* direction, the Cutter will be drawn onto the rod. After the Cutter is properly secured to the Extension Rod, you can begin cutting by gently pulling on the Handle of the Rod and by rotating the Cutting Head in a *clockwise* direction.

Cutting oil should always be used with any cutter to increase



**FIGURE 5** - Barrel throat being recut on Colt Diamondback



its effectiveness, aid in insuring that the cuts will be as smooth as possible, and to extend the life of the cutter. **NEVER** under any circumstances, should the Cutter be turned in a *counter-clockwise* direction while it is being pulled into the barrel. To do so will dull and possibly ruin the cutting edges of the tool. We repeat -**NEVER** turn any Cutter in a *counter-clockwise* direction.

You may be surprised at how easily the Cutting Tool operates. Do not get carried away! It is quite easy to cut more than you should, either when cutting a chamfer or facing off a barrel.

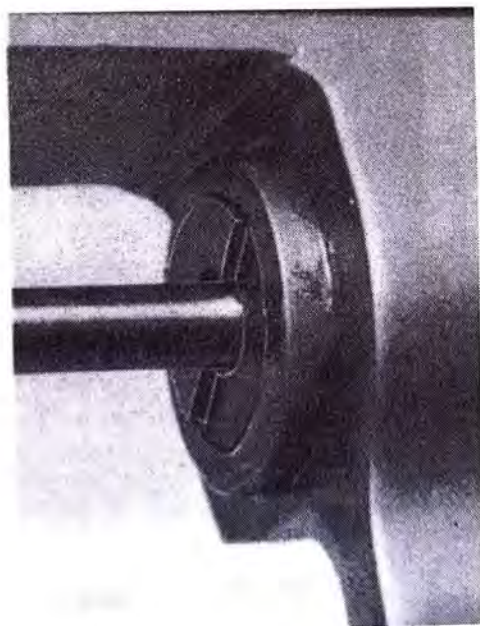
When cutting a chamfer, you normally do not want to have the internal diameter of the rear-most portion of the chamfered area to be over .020" larger than the diameter of the bullet of the cartridge that is being used. In other words, in a .38 Special revolver, which utilizes a bullet that is normally .356" to .358" in diameter, the maximum diameter of the chamfer should be .376" to .378". A very simple and easy way to check this, and to insure that you do not cut more than you should, is to utilize the Brownell Chamfer Plug Gauges. By using these Gauges, you can tell at a glance exactly how deep a cut should be.

Above all, be extremely careful when cutting with this tool. It is very easy to cut too much. Go slow! Be careful!

The precision ground and hardened Barrel Chamfering Plug Gauges are available in .22, .38, .44 and .45 calibers. Each gauge



**FIGURE 6** - Excessive chamfering readily apparent in this barrel



**FIGURE 7** - Plug Gauge shown in properly cut chamfer

has an integral pilot to assure precise alignment with the axis of



the bore and to minimize measurement error. The most important part of each gauge is the .025" step located at the base of the knurled handle. The top of the lower step and the top of the upper step represent the minimum and maximum degrees of acceptable chamfering respectively.

These gauges can be used quickly and easily. Begin by carefully cleaning the throat area of the barrel to remove any oil or metal chips which could result in an erroneous reading. Carefully place the appropriate caliber gauge in the barrel throat utilizing the knurled handle. If the lower step of the gauge is above the edge of the barrel extension then additional chamfering is needed. If the top of the upper step is **BELOW** the edge of the barrel extension, **TOO MUCH** material has been removed (see Fig. 6)! Ideally, the chamfer should be cut so that the lower step is slightly below the edge of the barrel extension while the top of the upper step is just above the barrel extension (see Fig. 7). While doing barrel chamfering, it is **IMPERATIVE** that you check your work **FREQUENTLY** with a Barrel Chamfering Plug Gauge.

In utilizing any of the 90° Facing Cutters on the rear-most portion of the revolver barrel or barrel extension, you should be



**FIGURE 8** - Checking cylinder gap with feeler gauge

aware of several points, especially when fitting a new custom barrel. In no case should the clearance between the face of the cylinder and the barrel extension (the cylinder gap) exceed .008". If you have more than .008" cylinder gap, you are almost certain to



have lead "spitting" and excessive loss of gas, thereby reducing your pressure and velocity.

Ron Power believes that the optimum clearance for the cylinder gap is .006" to .007" (see Fig. 8). According to Ron, the absolute minimum cylinder gap should be such that with a .004" feeler gauge in place between the face of the cylinder and the barrel extension, you can pull the revolver through the double action cycle without having the cylinder hang up on the feeler gauge. In other words, the cylinder should be able to spin freely with a .004" feeler gauge in place. If you set up a revolver with a cylinder gap of less than .004", you run the risk of having a malfunction due to the normal buildup of powder residue and fouling on the face of the cylinder during firing.

The 90° Facing Cutters can also be utilized to remove "high" spots on the barrel extension which may bear against, or "drag", on the face of the cylinder. Again, exercise **EXTREME CAUTION** when utilizing this Cutter. If you accidentally cut too much and the cylinder gap exceeds .008", you may be forced to refit the barrel to the revolver! **BE CAREFUL!**

After the Cutters have been utilized, you may wish to use the Brass Lap which is available for the 18° chamfer. The Lap is attached to the extension rod in the same manner as the Cutters. Spread an abrasive compound such as the Clover Silicon Carbide Paste on the lap and gently draw it into the chamfer. While rotating the lap in a *clockwise* direction, pull gently towards the muzzle. Remove the lap to check the chamfer periodically until the desired degree of smoothness is obtained.



**FIGURE 9** - Chamfer lap in place



Depending upon the finish of the chamfer, you may wish to start lapping with the Clover 240 Grit Paste and work up to a mirror finish with the 800 Grit Paste. While a highly polished chamfer sure looks great, it is not necessary for optimum performance. Also, a highly polished surface will quickly become etched by hot gases from the chamber when the gun is fired.

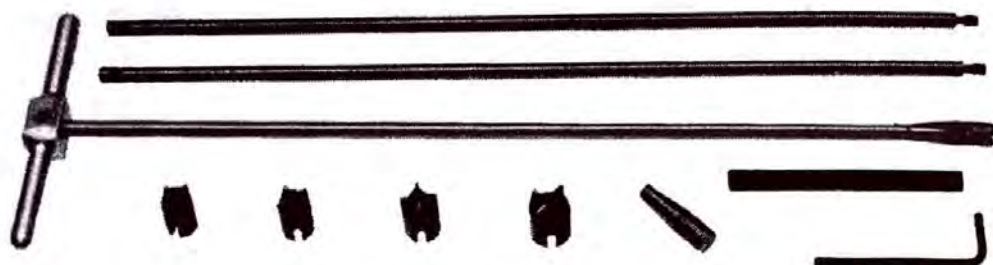


FIGURE 10 - Brownell's .22 Chamfer Set

While the procedures are identical to those utilized for the larger calibers, the .22 caliber chamfering tools are different in two respects: First, due to the extremely small bore diameter in a .22, it is not practical to utilize either a Brass Pilot or a Center Guide. In lieu of these, we have provided three Extension Rods in .211", .213" and .215" diameters respectively.

It is necessary to utilize three different sizes due to variations in bore diameter in .22 caliber handguns. After cleaning the barrel, carefully insert the Extension Rod which provides the closest, snuggest fit. This Extension Rod will act as a pilot and will properly center the various cutting tools. Second, the .22 kit is available only with an 11° Chamfering Cutter. The 18° Chamfering Cutter is not available in .22 caliber.

After you have completed your work with the Chamfering Tools, be sure to check the barrel to insure that you did not leave a Brass Pilot in the bore! It is also necessary to thoroughly clean the bore with a liquid bore solvent and cleaning patches in order to make certain that all metal shavings or traces of lapping compound are removed. The bore should be spotless! The frame and other parts of the revolver should also be wiped down and lightly oiled.

We are especially proud of our Chamfering Tools. As with all our tools, we guarantee their quality and construction. If you have any questions relating to their use or if you have any suggestions for improvements or modifications, please feel free to contact our Technical Services Section by mail or phone.

- Ron Power and The Crew at Brownells



## CHOKE ADJUSTING WITH ANGLE BLADE REAMERS & HONE

### Professional Instructions

In itself, the opening up of a shotgun choke to a slightly larger diameter is a fairly simple matter if the proper tools are available, for it requires nothing more than the controlled removal of a bit of metal from the forward bore of the gun barrel. The professional adjustment of a shotgun pattern at a given yardage requires a number of considerations, all of them equally important to the end result and the customer's satisfaction with your workmanship on his pet gun - and the RESULTS he receives with it.

You will have two basic adjustments to make. One will be for the hunter and the other for the trap or skeet shooter. The hunter's adjustment will be relatively easy, for he, in all probability, will want his choke changed from full to improved modified or some other straight-forward change. Also, generally the hunter will be using standard factory ammunition. The target shooter will pose a different problem. He will probably want the choke "opened just a bit" to give such-and-such a pattern.

For the hunter, the chart below will give you the approximate amount of metal to remove - as explained later. For the target shooter, you should determine the exact load being used (wads, shot, case and primer). Your final patterning should be done with these specific loads as loaded by the shooter. You should point out to him that any change what-so-ever in his loads will change the effective pattern and that the work you are going to do, and the pattern you will achieve, will be for the ammunition he submits - only!

*Note: If handloads are submitted by your customer, you would be well advised to tear down one of them to check wads, powder and shot used - and weigh them out - so that if you have to load extras, you can duplicate his load. If extra work is involved, it should be taken into consideration when making your final charges for the choke adjustment.*

The four reamers and bore hone shown will cover any choke requirements from a cylinder bore in the 12 gauge to a full choke in the 28 gauge.

#B . . . . 28 Gauge . . . . 17/32" — 19/32" (.53125 — .59375)

#C . . . . 20 Gauge . . . . 19/32" — 21/32" (.59375 — .65625)

#D . . . . 16 Gauge . . . . 21/32" — 23/32" (.65625 — .71875)

#E\* . . . 12 Gauge . . . . 23/32" — 25/32" (.71875 — .78125)

\*Start first cut on very tight 12 ga. full chokes with 16 ga. reamer.

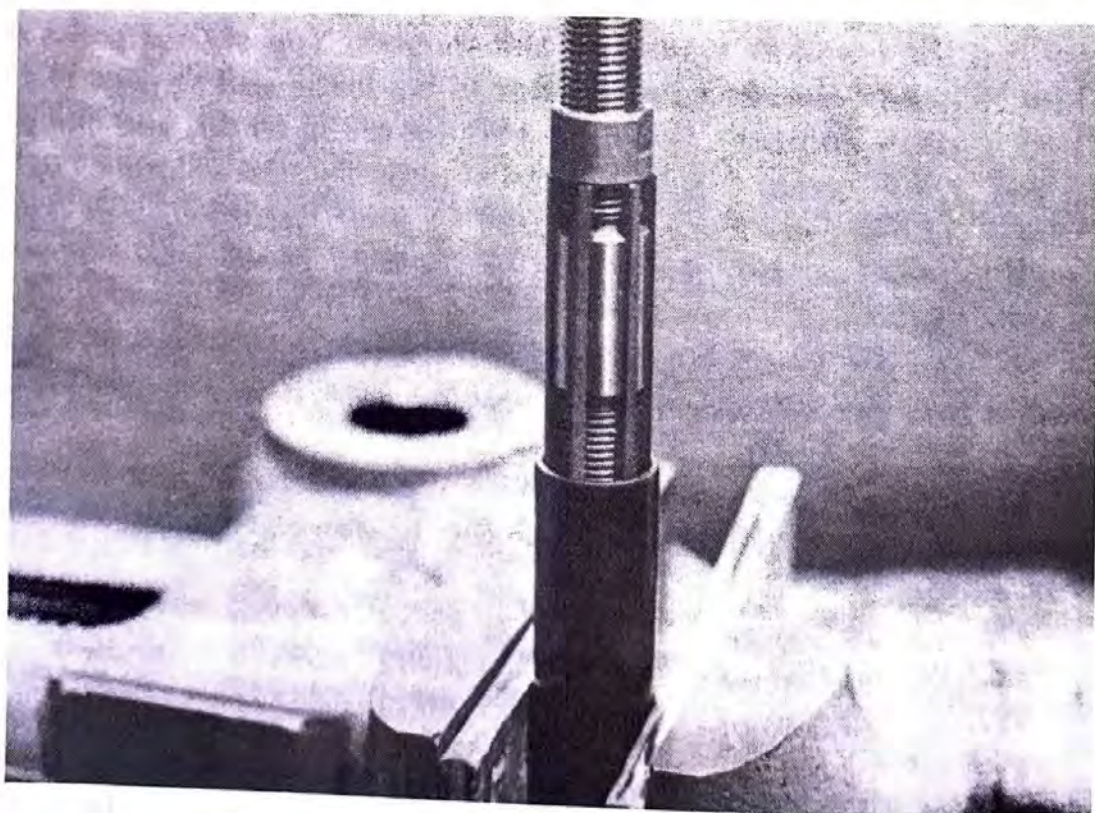
The actual working dimensions of each reamer will slightly ex-





ceed the above factory max/min specifications. The reamers are equipped with angle blades to provide a perfectly flat slicing cut at all diameters to eliminate chatter. Blades remain absolutely true at all size adjustments and do not bulge or "curve", thus assuring proper bore configuration.

As with all reamers, the cutting edge should be lightly honed for best performance. Arkansas stones and thin India stones should be used for sharpening. The reamers are fine service tools and should not be abused. Do not throw them in with other tools.



The better way to keep them clean is to keep them oiled and wrapped



at all times when not in use. Do NOT knock chips out of reamer on edge of bench or on block of wood. Carefully brush reamers to remove chips.

NEVER back your reamer off the job. Always keep turning in the same direction until the reamer is removed from the barrel. DO NOT take a big cut at one time with Angle Blade Reamers... Not more than .003" and preferably less. ALWAYS release the tension on your Angle Blade Reamers when not in use. In COLD WEATHER Angle Blade Reamers should be warmed before exerting extreme setting pressure to prevent possible fracture of blades.

### Bore & Choke Dimensions

Actual bore and choke dimensions vary from one manufacturer to another and sometimes even from barrel to barrel of the same model. Measurements should be made of each barrel with a bore micrometer or choke calipers. The bore diameters and amount of constriction for each choke listed on the chart is an average, using the American Standard, but should be used as a guide only.

### Bore & Choke Dimensions

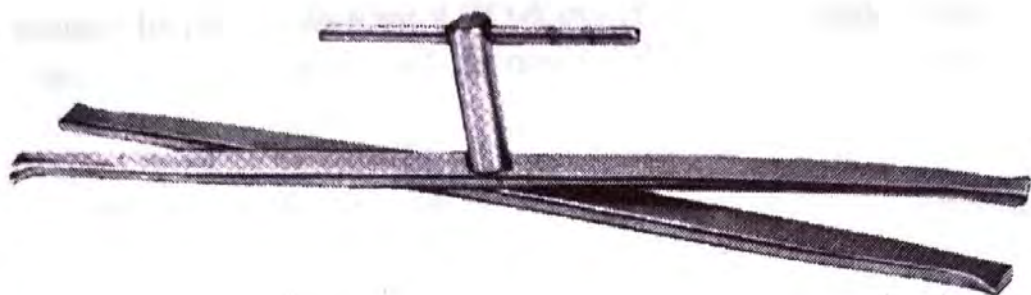
GAUGE	BORE DIA.	AMOUNT OF CONSTRICTION						
		Full	Imp Mod	Mod	Skt-2	Imp Cyl	Skt-1	Cyl
12	.729	.035...	.025...	.019...	.012...	.009...	.005...	.000
16	.667	.028...	.020...	.015...	.010...	.007...	.004...	.000
20	.617	.025...	.019...	.014...	.009...	.006...	.004...	.000
28	.550	.022...	.016...	.012...	.007...	.005...	.003...	.000

When referring to the Bore & Choke Dimensions Chart, remember that the differences between the various choke diameters is OVER-ALL Diameter difference. For example, a customer wants a 12 gauge Full Choke opened up to Modified. The difference in constriction between the two chokes is .016" (Full .035" minus Modified .019"). This is difference in Diameter - but the actual amount of metal to be removed at the circumference is only .008". DO NOT FAIL to take this into consideration for if you were to make a .016" cut (or a series of cuts totalling .016") you would increase the inside diameter by the sum of the cuts, or by .032"!!

### Brownell Choke Comparison Calipers

The Brownell Choke Calipers are COMPARISON calipers and are designed with sufficient accuracy to give the amount of CHOKE CHANGE within a few ten-thousandths of an inch. For actual BORE MEASUREMENT they will be accurate within a plus-minus of .002". Calipers giving Zero variance between both



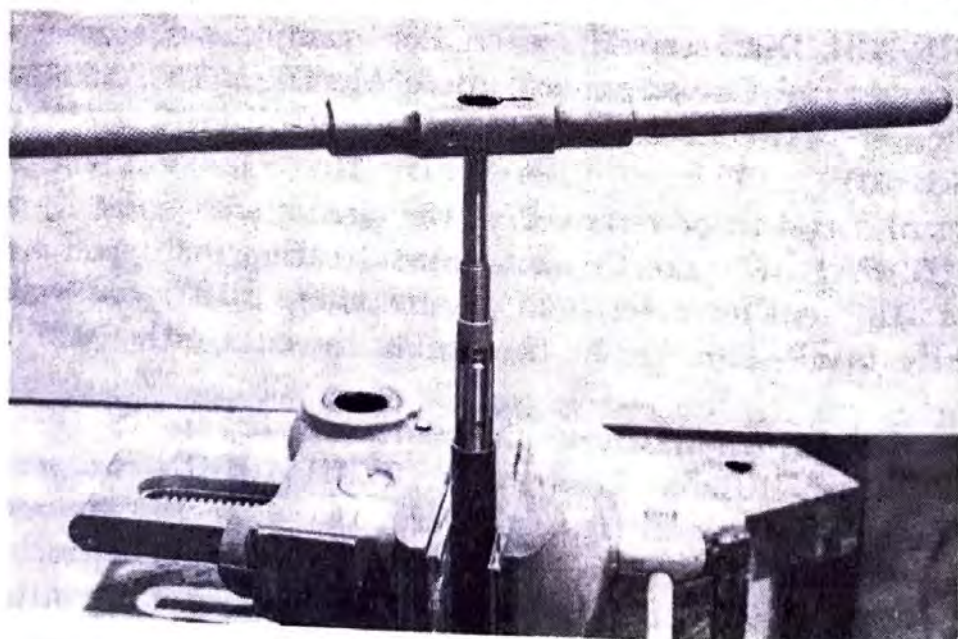


ends would cost three to five times as much - unnecessary when bore diameters vary so greatly.

Using the calipers is quite simple, and when once tried, getting accurate measurements will come naturally. Insert one end of calipers into bore, expand to "touch fit" and locate maximum choke. Lock T-handle and carefully mike protruding comparison end of calipers. This is best done with barrel locked in vise. Next measure the cylinder bore of the gun. Subtract your two measurements and refer to the chart above. This will give you the choke of the gun. Calipers are made of tool steel - not hardened. They are long enough to reach cylinder bore of all American made guns, including the 3" Browning Magnum.

### Doing Choke Adjustment

The barrel should be removed from the action before altering the choke or if this is not possible, all of the action parts should be removed. Secure the barrel in a padded vise in a vertical position, muzzle toward the ceiling and approximately waist high. This is important as cutting with the barrel horizontal will remove more metal from the bottom due to the weight of the reamer. In addi-

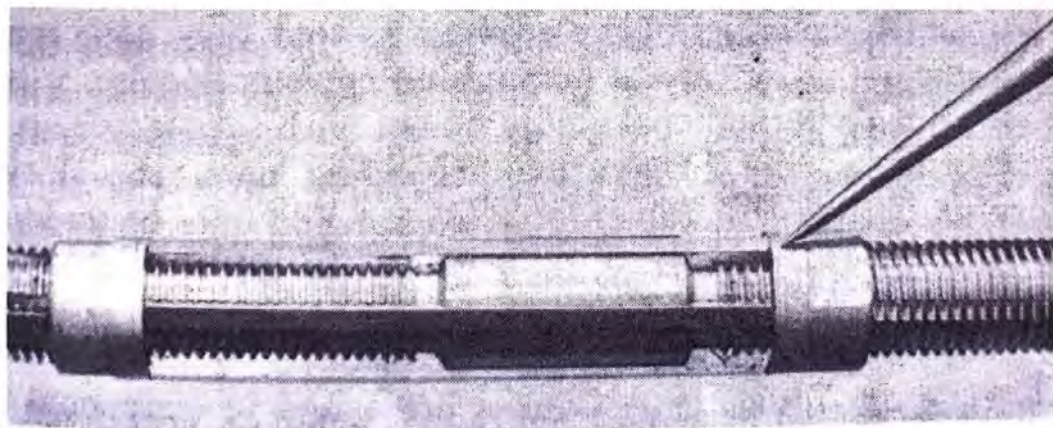




tion to the reamer you will need: a large tap wrench to hold the reamer, dark cutting oil (Do-Drill will work fine), a cleaning rod and plenty of patches. A small can or bucket on the floor under the barrel will catch the excess oil and used patches.

Select the appropriate reamer and with it adjusted to minimum diameter, try it in the muzzle. If it goes all the way in without touching the sides, remove it and adjust for a larger diameter. This is done by backing off on the rear adjusting nut a 1/2 turn maximum and tightening the front adjusting nut. This pushes the blades to the rear and up the inclined cuts to enlarge the overall diameter of the reamer. The reamer is tapered with the small end at the front to guide the reamer for correct alignment with the bore and choke.

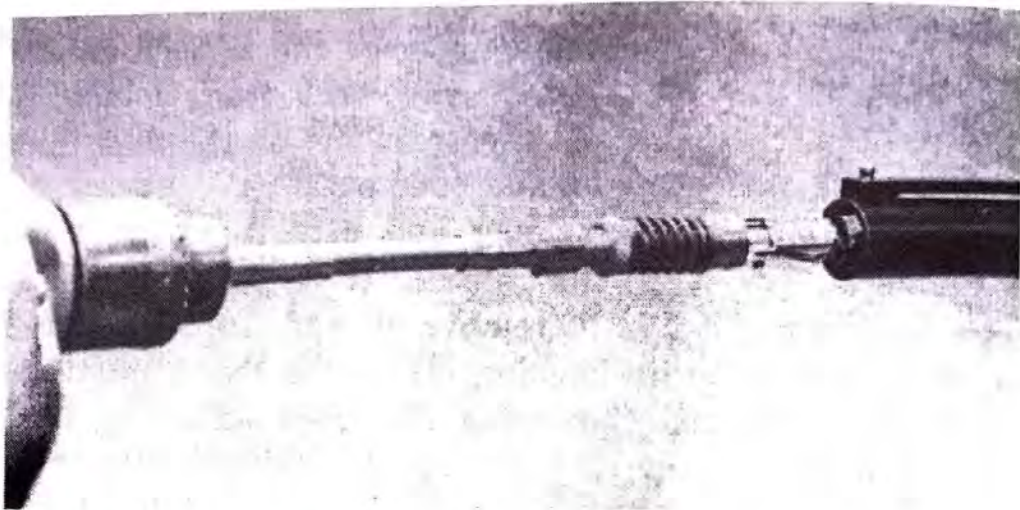
Adjust the reamer a small amount at a time until it just touches the sides of the choke. Apply the cutting oil and make the first cut by rotating the reamer in a clockwise direction allowing the weight of the reamer and wrench to apply the pressure. When the reamer has cut its full length, continue rotating it in the same direction and withdraw it from the barrel. Do not reverse the direction of rotation or withdraw without the clockwise rotation or the choke will be scored. Brush the chips from the reamer and clean the barrel with a tight patch. Measure the choke and repeat the procedure if additional metal must be removed. Test fire for patterns if the customer has specified a particular percentage at a given yardage.



There is a flat on the adjusting nuts that can be used as a scale. Position this flat between two of the blades and make a cut. Now remove the reamer and rotate the nut to a position between the next two blades. The second cut will remove .002" from the choke **DIAMETER**.

The final .001" should be removed with the hone. The stones are pressed against the sides of the choke by the coil spring and





the pressure should be firm at all times to prevent chatter. The flexible shaft assures correct alignment with the bore. The hone can be rotated in several ways but a regular electric hand drill is all that is necessary. Insert the hone in the choke and turn the drill on. Move the hone in and out for about fifteen seconds with plenty of cutting oil in the barrel. **ALWAYS** turn the drill **OFF** before removing the hone. Wipe the bore clean and inspect. The barrel should be smooth and free of all scratches.

### Chrome-Lined Barrels

These reamers will not cut chrome-lining, and any attempt to do so will ruin the reamer and void the guarantee. To determine if a barrel is chrome-lined, touch a drop of Oxpho-Blue or other good cold blue to the inside of the muzzle. If it blues or stains, it is not chrome-lined, and O.K. to work on.

Gunsmith customers have advised us that they have removed the chrome-lining by careful honing and copious flooding with cutting oil prior to normal choke adjustment with satisfactory results. This can be a tricky operation depending upon the thickness/uniformity/hardness of the chrome, and should only be undertaken with caution and intelligence.

### Reverse Or "Jug" Chokes

Reverse or "Jug" type Chokes are found in occasional guns. The choke effect is obtained in Reverse Choking by the removal of metal from the bore starting a short distance behind the muzzle and extending down the barrel towards the breech. On a 12 gauge, for example, the recess may be from 10" to 12" long and about





.015" deep for modified choke and .021" deep for full choke. You can readily see from this that you cannot "Open UP" a choke such as this by making the recess deeper. Doing so would tighten the choke! Opening the pattern on such a gun can only be achieved by very carefully honing the short stretch of barrel between muzzle and choke recess. Repeated test firings should be made during this type of adjustment to be sure too much metal is not removed and the pattern opened too much. . . Proceed with GREAT CARE.

A higher than normal charge should be made for choke adjusting if a great deal of test firing is necessary to achieve the exact percentage pattern required by the customer. Also, you will find that after doing a very few jobs that experience will make it possible for you to proceed quite rapidly down to the final honing operation.

- *Ralph Walker and The Crew at Brownells*

## **POLY-CHOKE VENTILATED RIB INSTALLATION INSTRUCTIONS**

### **Introduction**

Before you install a Poly rib, you have to know two things: First, what is a Poly-Choke Featheraire Ventilated Shotgun Rib and, second, how to sell the rib to a potential customer.

The rib is machined from single bar of high tensile strength aluminum alloy, precision contoured on the bottom to exactly match the contour of the individual barrel and prevent any dips or bends in the straight top section. Viewed from the side, the top section is a series of blending arcs designed to break up light reflection and present a non-glare appearance. At the same time, viewed from the end, the top section has a series of grooves running parallel to the length of the rib that assist in leading the eye from the rear to the muzzle for increased pointing ability. The top and bottom sections are connected by pillars, or supports, left during the machining to provide the necessary strength to the top section.

The special aluminum alloy soaks up the heat generated during firing and dissipates it faster than the steel barrel, thus keeping the barrel cooler during rapid firing. However, it is flexible enough to stand barrel whip without cracking or breaking. Perhaps one of its best advantages is that the total weight of the standard 5/16 inch width rib on a full length barrel is only 2 ounces! This avoids any interference with the gun's weight and balance. The finish is a hard coat of anodizing to match the barrel color and resist damage



from scratches.

The rib is attached to the barrel with a specially engineered adhesive with 18,000 pounds per inch tensile strength. This system avoids the necessity of rebluing the barrel after installing the rib as is required with other systems that attach the rib by silver soldering supports to the barrel. (Incidentally, it is very difficult to match the color of a newly blued barrel to the receiver unless the same bluing system is used for both.) While the Poly-Choke Rib cannot be pulled from the barrel by shear strength, or shot off, it can be easily removed and reinstalled if the barrel should require rebluing at a later date.

The Poly-Choke Company has a national advertising campaign and many customers will ask for the installation if you will simply display a sign that you install Poly Ribs. However, in these cases you are simply an order taker and not selling the rib. You can double or triple your volume with a simple three minute demonstration.

Pick up a common three foot wooden yardstick at your local paint or hardware store. This is your rib sales tool. Have the potential customer turn the yardstick flat side up, and with the end about one foot from his eye, sight down it at a small object 30-40 yards away. Now ask him to turn the yardstick edge up and sight at the same object. The flat side approximates his view down a plain barrel while the edge will approximate a rib equipped barrel. An even better demonstration can be made using a sample gun with interchangeable barrels, one plain and one ribbed. This will clearly show the advantages of the straight sighting plain and how the center bead helps keep the barrel lined up on target to prevent gun canting.

For your own protection, each shotgun should be shot to check point of impact BEFORE attaching the rib. Bent barrels are more common than generally realized, as it is quite easy to accidentally bend a shotgun barrel. And of course mass produced shotguns could leave the factory slightly bent, or with the choke in crooked enough to make the gun shoot "off". Poly Ribs are designed to maintain original factory point of impact, and if the point of impact is off before you install the rib it will still be off when you are done. In this situation, installation of a rib will not help solve the problem. And worse, if your customer then patterns his gun and finds it shooting "off", he is naturally going to lay the blame on you. So...it is best to check that point of impact before you install the rib, and make any necessary corrections by barrel bending immediately.



## Tooling

Many of the following tools are already on hand in the average gun shop and it is also possible to install ribs without all of the tools listed. However, proper tools allow correct installation in the minimum amount of time and time is money.

**1. Rib Holding Fixture:** The 24" will get you started, but as your rib business grows you will want to add the 18", 21" and 28" lengths. The 18" and 21" will be necessary for short barrels with choke devices. Order the 28" fixture and cut to 18" and 21". This will leave two short sections that can be used to adapt Poly Ribs to handguns.

**2. Front Sight Center Fixture:** This is absolutely necessary for locating the exact center of the rib for the front sight. You will also find it useful in other sight work in your shop.

**3. Adhesive-Catalyst:** This is the special bonding agent designed to secure the rib to the barrel when the two are mixed in correct proportions. 18,000 lb. sq. in. tensile strength allows barrel and rib expansion and contraction from the heat of firing while maintaining the rib securely in position. No other adhesive should be substituted.

**4. Drills:** Number 47 as the tap drill for 3-56 threaded front sights and number 36 as the clearance drill for the same size sight. Number 31 as the tap drill for 6-48 threaded front sights and number 25 as the clearance drill for the same size sight.

**5. Taps:** Number 3-56 and number 6-48 for tapping barrels for the front sights. The 3-56 will also be needed to clean out the pre-threaded middle sight hole.

**6. Brownells Aluma-Hyde:** To touch up the end of the rib after cutting it to correct length and also to hide any scratches to the anodized finish during the installation of the rib.

**7. Brownells Medium Size Sight Bead Installer:** This allows installation of the small middle sight without marring and saves time.

**8. Brownells Nylon Punch:** This is reshaped in the form of a wood chisel on one end to cut away excess cured adhesive without marring the rib or barrel.

**9. Tuluol:** This is a solvent that must be purchased locally as it cannot be shipped and is available from any Sherwin-Williams paint store. Other solvents may work for cleaning but they may also react with the bonding agent and prevent good secure installation.

**10. Wooden Applicators:** Used to mix and apply the bonding agent. Medical tongue depressors are ideal.

**11. Filament Tape and 1/2 Inch Rubber Bands:** These are used



to secure the rib and holding fixture in correct position on the barrel while the bonding agent is curing. The filament tape prevents the rib from sliding out of position while the 1/2 inch wide rubber bands provide pressure to squeeze the rib to the barrel contour.

**12. Powder Scale:** The adhesive and catalyst must be weighed in exact proportions prior to mixing to assure perfect bonding. Any powder scale is acceptable.

There are several other useful tools such as a holding rack while the ribs are curing, scribes, jewelers saw, etc., but these can be made in the shop or added as needed.

### Ordering Ribs

Ribs are stocked for the most popular brand shotguns and in the common lengths of 26 - 28 - and 30 inches in 12, 16, and 20 gauge. Many of these ribs will fit other manufacturers, models, and even other gauges. See the interchangeability list. Special order ribs are available, but allow extra time for delivery. On *all* rib orders it is absolutely essential that you specify:

1. Manufacturer, Model and Gauge of Gun.
2. Length of Rib.

Note: The forward solid end of Poly Ribs are purposely left slightly long for any minor mistake in measuring to allow cutting to exact length requirement. However, the measurement stated should be as close as possible.

3. Front Sight Thread Size - Either 3-56 or 6-48.

### Initial Barrel Preparation

The first step is to remove the front sight. If it is the common screw-in type, check to be sure that it is 3-56 thread size. If it is any other size, drill the hole out with your number 31 drill and tap for a 6-48 Poly sight. It is possible to file the top of the old sight flush with the barrel to plug the hole provided the new sight location will be a minimum of 1/4 inch away from the plug.

Ramp type front sights such as those found on Browning semi-automatics, Remington semi-automatics, etc. must be completely removed.

The barrel surface must be thoroughly cleaned as half of the secret of good rib installation is an absolutely clean barrel surface. Here are the points to remember.

1. If the barrel has just been reblued, wait at least 48 hours after bluing before installing the rib. Wash the barrel several times in mineral spirits, rubbing it hard each time with a clean cloth to remove all traces of oil and any bluing salts residue. Common household vinegar can be used to neutralize any bluing salts if this



presents a problem.

2. On the average barrel it is a matter of getting all of the oil, dirt, and grime off the barrel surface until you are down to good clean metal. Cleaned bluing will not prevent good bonding, but any foreign residue will prevent good bonding. Wash the barrel at least twice in mineral spirits, scrubbing it hard each time with a clean rough cloth. As a final test, rub the barrel with a clean white cloth and then inspect the cloth. If it has any dark streaks, the barrel is not clean! Generally this is an indication of rust in the pores of the metal and rust is a flake or scale of oxidized metal that will prevent good bonding. DU-OL and four ought (0000) steel wool applied where the rib will be installed will remove any trace of rust, then clean as described above.

### Initial Rib Preparation

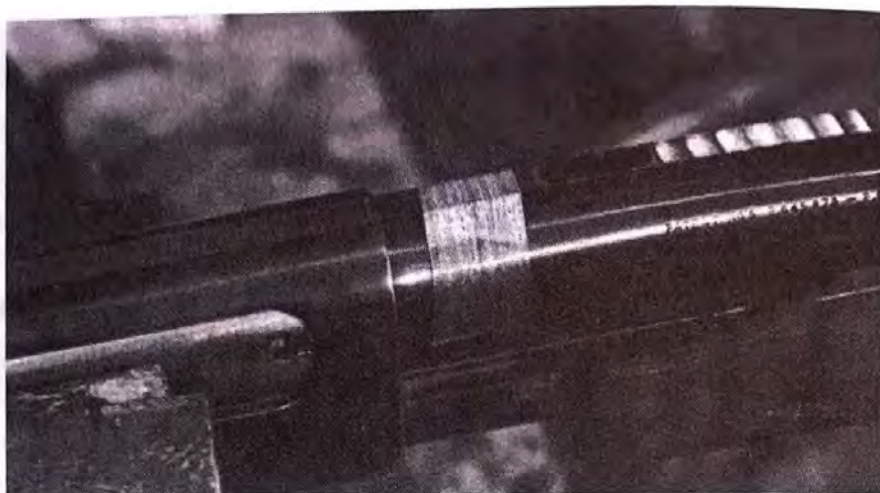
The top of the Poly Rib is flat except where the rear tail tapers down to match the receiver. The bottom of the rib is contoured to match the round barrel but most important, it is contoured lengthwise to match the barrel from breech to muzzle. When properly installed the rib bottom contours hug the barrel while the top of the rib is flat and straight for sighting.

The primary purpose of the rib holding fixture is to keep the rib straight during the installation and assure that there is no buckling or gaps where the contoured rib bottom contacts the barrel. To achieve this it is extremely important that the flat top of the rib be in full contact with the flat bottom cut in the rib holding fixture. There are two ways to do the job and it is simply a matter of personal preference which way is used.

**Method Number One:** With the barrel in the receiver, secure the receiver in a padded vise and support the muzzle end of the barrel. Now lay the loose rib on the barrel in its approximate position. With a short length of filament tape, temporarily secure the tail of the rib to the barrel. Straighten the rib as much as possible and secure the front end of the rib with another piece of filament tape. Don't worry if the rib is slightly crooked.

Loosen each of the lock screws on the rib holding fixture and check to see that no foreign matter is in the milled groove. Place the rib holding fixture over the rib, taking care that the rib enters the milled groove straight. If you are right handed, press down on the rib holding fixture about half way with your left hand. Tighten the lock screw next to your hand. Now move your hand toward the muzzle about six inches, press down and tighten that lock screw. Move your hand back toward the tail of the rib about the same distance past the first screw you tightened, press down and





In the method number one, the rib is taped to the barrel prior to attaching the rib holding fixture to the rib.

tighten that lock screw. Now move back toward the muzzle about six inches from your last position and repeat the pressure and tightening operation. Keep moving back and forth, first toward



The holding fixture, lock screws loosened and positioned half way of the rib is being installed on the rib. Note downward pressure squeezing rib fixture, rib and barrel together as lock screw is tightened. Screw in front of hand will also be tightened before pressure is released. This assures that flat top of rib is firmly seated against milled flat in rib holding fixture.

muzzle and then toward the tail until all lock screws are firm. It is important that you start in the middle and work your way toward first one end of the fixture and then toward the other.

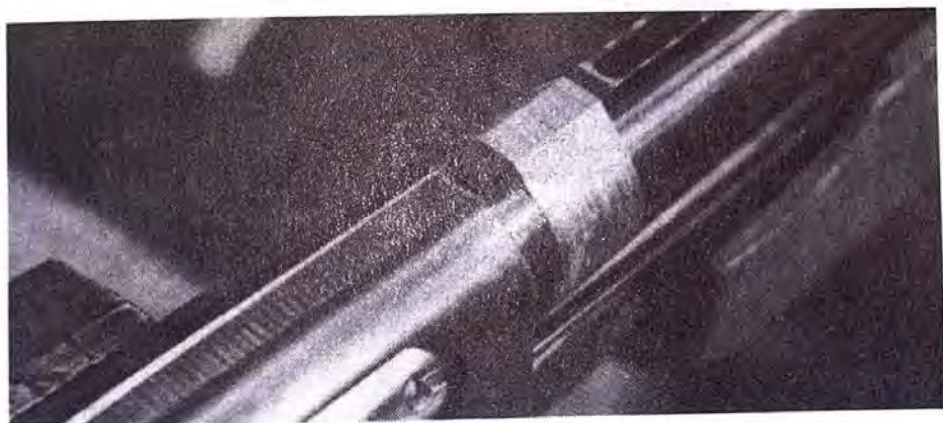
When completed, the rib should be firmly in the holding fixture with every lock screw tight. Pressing down on the fixture, look closely where the rib joins the barrel. There should be no gaps. You should have a minimum of one inch clearance between the end of the rib holding fixture and the rib on both the muzzle and tail end. You can have as much as three inches extending past the fixture but more than this may allow the rib to flex sideways.



You have used the matching contour of the rib bottom and the barrel to press the flat top of the rib against the flat milled groove of the holding fixture while the lock screws were tightened.

**Method Number Two:** Loosen all of the lock screws in the rib holding fixture and check to be sure no foreign matter is on the milled flat cut. With the fixture flat on a bench, milled cut up, press the rib down into the milled cut positioning the holding fixture about half way of the rib. Again a minimum of one inch of rib should extend past each end of the fixture with three inch extension on each end the maximum.

Place a piece of soft pine wood about four inches long and two inches wide against the bottom of the rib at the half way point of its length. Now holding the fixture and the wood in your fingers, insert the assembly in your bench vise. (One of the vise jaws presses against the back of the rib holding fixture while the other presses against the piece of wood.) Tighten the vise handle slowly until you feel the top of the rib press against the milled flat of the



The rear, or tail, of the rib is temporarily taped in position for rib length measurement. Note 1/16 inch gap between rear of rib and receiver and that the breech lock is in locked position.

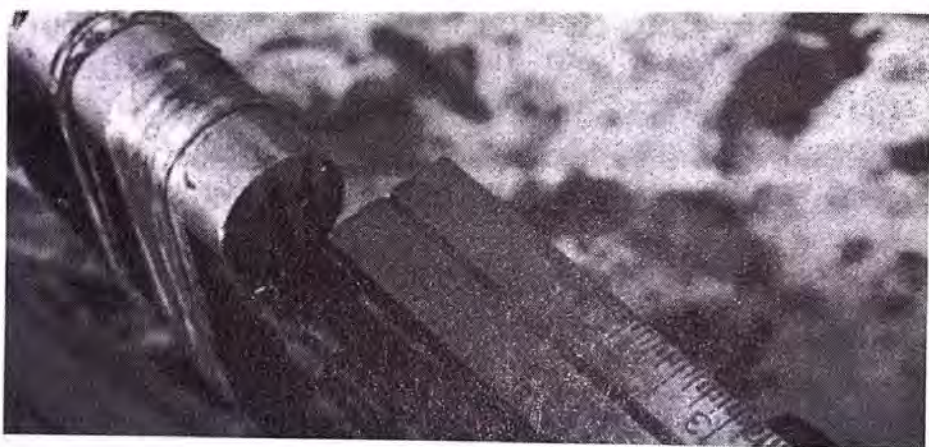
holding fixture. Tighten the lock screw. The soft pine wood prevents damage to the contoured bottom of the rib. Now slide your wood and the fixture toward the muzzle end of the rib and when in position about four inches from the first point, retighten the vise and tighten the next lock screw on the rib holding fixture. Go back toward the rib tail past the starting point, retighten the vise and tighten the lock screw. As in the first method, work your way toward the ends of the fixture from the middle where you started, first toward one end and then the other until all lock screws are tight.

The second method accomplishes about the same as the first but be sure to lay the rib on the barrel and check the matching contour of the rib and the barrel for gaps.



### Measurements

With the first method described, the rib is already in temporary position on the barrel. If the second method is used it will be necessary to temporarily tape the rib position for measuring. Close the breech block to locked position. This step is necessary as there is sometimes a small amount of rearward movement in interchangeable barrels when the breech block locks. If the rib is measured without the breech block being locked, the rim may be damaged if the barrel moves back the first time the breech block is locked. Make sure pump and auto barrels are completely in place and tightened.



Using the edge of a straight ruler aligned with the milled section of the receiver to line up the rear of the rib. Sometimes the milled section is narrower or wider than the rib width but this method can be used with judgement to make a perfect alignment of the two.

Regardless of how the tail of the rib is matched to the receiver or barrel extension, leave  $\frac{1}{16}$  inch gap between the tail end of the rib and the receiver or barrel extension. This allows the rib to go down snugly during installation. If cut exactly for an initial touch, the rib may buckle when it is being permanently installed. The  $\frac{1}{16}$  inch is simply clearance to allow for contour compression during installation.

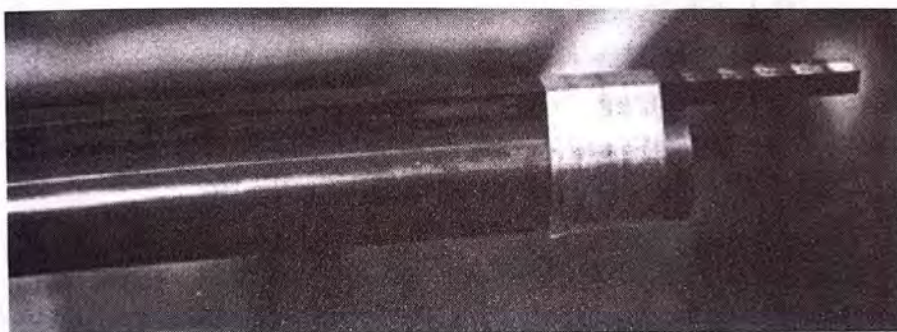
Most receivers have a groove or serrations down the top. Use this as a guide to center the tail of the rib on the barrel. A straight edge ruler will prove very useful in this alignment. You can scribe a faint line on the barrel at the tail of the rib for fast alignment in the final step of installing. If there is no groove or serrations in the receiver, use calipers to measure the front top width of the receiver. Halve this measurement and mark the line with a soft lead pencil. This will serve to align the rib on the barrel.

A few shotguns with the interchangeable barrels will have a sloppy fit of barrel to receiver and allow the barrel to move from



side to side. Press the barrel to the left and with a soft lead pencil and using the grooved receiver as a guide, mark the outside line on the barrel. Now press the barrel the opposite way, to the right, and repeat the pencil mark. Move the barrel back to center using your pencil marks as a guide. This center position is where you will align the rib as little else can be done to avoid the slop except squeezing the receiver together slightly and this is not a good idea with alloy receivers.

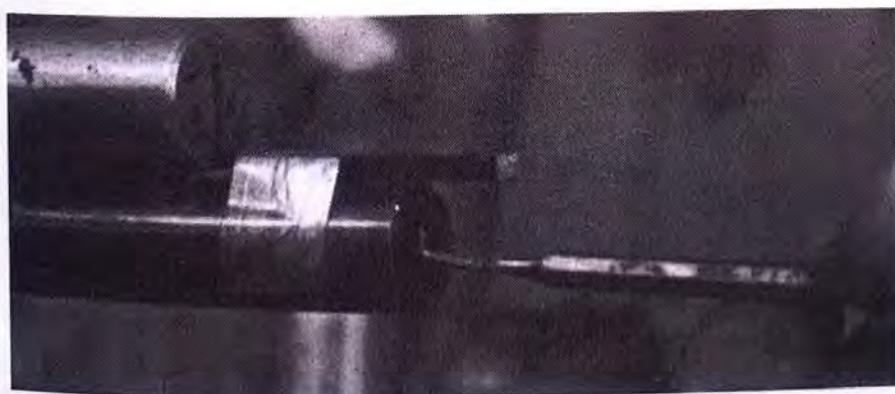
With the tail of the rib centered on the barrel and with its 1/16



The front of rib temporarily taped in position for rib length measurement and installation of rib fixture holder. Excess rib extends past muzzle.

inch clearance, use filament tape to be sure the position is maintained. Now center the rib as close as possible at the muzzle and use another piece of filament tape to secure it temporarily. You do not have to be exactly centered but try to get as close as possible.

You will now need a small homemade scribing tool. Heat the end of a large sewing needle and bend the front one quarter inch up at a right angle. The other end of the needle can be pressed into a piece of wood for a handle. A dental pick will make an even better scribe and most dentists have damaged picks that are yours for



A special 90° scribe made from an old dental tool about to be inserted into barrel to mark front sight hole LENGTH location. Marking the hole before removal of the anodized finish makes it more visible for drilling etc.



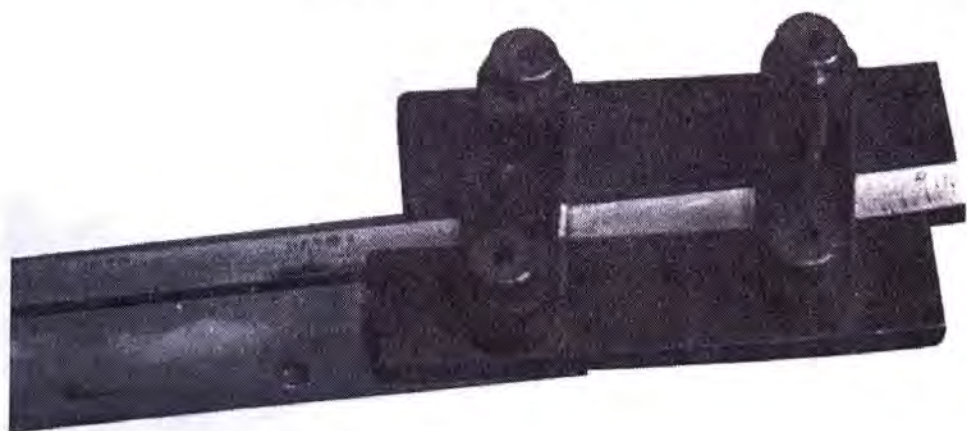
the asking. Just be sure the point is sharp and that the bend is no more than a quarter inch long.

With the front of the rib centered as close as possible, press it down with your left hand to be sure it is lying flat. Reach up into the muzzle with your scribe and let the right angled point enter the front sight hole. Rotate the scribe point to mark the underside of the rib. Don't worry about getting the scribe mark in the center of the rib for this mark is for correct LENGTH, not the center. At the same time remove the scribe from the bore and scribe the rib at the barrel muzzle across the width of the rib.

Remove the rib and its holding fixture from the barrel, turn the contoured side of the rib up and note the scribe mark for the front sight. Use your front sight center fixture to locate the center of the rib with your scribed mark determining the length. When all is aligned, center punch the position for drilling.

Place the flat of the rib against your drill table, contoured bottom of the rib up, and use the number 36 clearance drill for the 3-56 size sight or the number 25 clearance drill for the 6-48 sight. The sight passes through the rib and is screwed into the barrel during installation, thus pulling the front of the rib down firmly. The rib should never be threaded for the front sight. A block of plywood under the rib will allow you to drill through the rib without hitting the table. After drilling, turn the rib over and remove any burrs with the point of a larger diameter drill or a small countersink.

The end of the rib can be cut off at this point or left its full length and cut off after installation. Cutting prior to installation is the best for the beginner but if this is left until after installation, a neater job can be made though it does require careful filing. Before



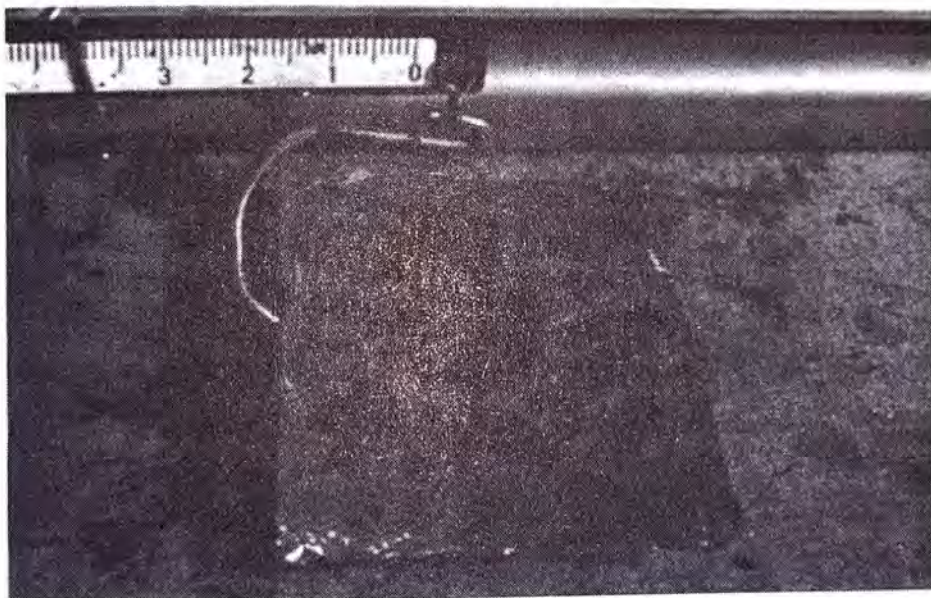
The sight center fixture in position with the punch directly over the scribed sight LENGTH mark. Striking the rear of the punch will mark the exact center of the rib at the correct location for drilling.



cutting the excess length off, check your scribe mark with a square. Cut just past the scribe mark on the excess side and file the end back to the scribe mark.

### Mixing The Bonding Agent

The correct mixture of the bonding agent is five parts of the black adhesive to one part of the catalyst by WEIGHT. When received, the top of the catalyst tube should be cut off with a knife and the contents placed in a small jar with a good cap. A baby food jar is about the right size. Roll the tube from the bottom like a tube of tooth paste to remove all of the catalyst. The shelf life of the catalyst is about six months provided the jar is kept sealed when it is not being used. Each time the catalyst is used it should be thoroughly stirred with a clean wooden applicator before mixing



The mixing board, tin square covered in aluminum foil with five parts adhesive and one part catalyst already on board. Note that the two ingredients are separated at this point to prevent contamination if some must be removed to achieve a balance.

with the black adhesive. Keep the lid of the black tight when not in use and never use a wooden applicator that has been in either of the two when removing the other for measuring.

Powder scales usually have a swinging pan and also a powder pan on the end of the beam. The powder pan should be removed and a thin sheet of tin about three inches square made to take its place. It may be necessary to add a drop of solder or cut off some of the tin to get the scale back in zero balance. The simple method is to use a small piece of aluminum foil wrapped over the tin square on which the two parts of the adhesive are mixed. When finished, the foil can be discarded and a new piece substituted for



the next batch. Be sure to add the foil when getting the scale to balance originally.

With the square tin wrapped in foil and the scale on zero balance, move the scale weight over to the 100 grain mark. With a clean wooden applicator scoop up some of the black adhesive. A gob about the size of the first joint of your trigger finger will be about 100 grains. Place this on the scale's foil covered tin square. Add or subtract adhesive until the scale balances. Now move the scale weight over to the 120 grain mark. With a new clean wooden applicator, scoop up a small amount of catalyst and add it to the foil covered tin square with the black adhesive but be sure to place it to one side. Do not mix the two at this point. Add or subtract catalyst until the scale balances. You have the 5-to-1 ratio by weight. (Shelf life of catalyst is 6 months. Replacement tubes are



Using a six inch section of old barrel and aluminum oxide cloth around it to remove the anodized finish in the bottom rib contour. Note clean rib.

available - see the catalog for these, and current prices. The Poly-Bond Adhesive lasts indefinitely.) Remove the foil covered tin square and with one of the wooden applicators thoroughly mix the two ingredients together. When properly mixed, there should be no brown stains in the bonding agent. You have about thirty minutes working time before the bonding agent starts curing.

### Final Rib Preparation

The black anodizing on the contoured bottom of the rib must be removed to allow correct bonding. A six inch section of old shotgun barrel with number 80 or 120 grit aluminum oxide cloth wrapped around it will make an ideal tool for the job. Secure the



rib and holding fixture in a padded vise with the contoured rib bottom up. Scrub back and forth with your tool, changing the cloth as necessary, until the anodizing is removed. Be sure to support the ends of the rib that are not in the holding fixture to prevent bending the rib ends. It is not necessary to remove every trace of the anodizing but the more you remove the better the bonding. There are five points that should be remembered during this operation:

1. Leave the sanded surface rough and do not touch it with your fingers. Use a dry cotton Q-Tip to wipe away any dust.

2. When sanding is finished and the dust wiped away, soak a Q-Tip in Tuluol solvent and scrub the prepared surface of the rib from one end to the other. Then with another dry Q-Tip wipe the surface clean.

3. Any aluminum alloy begins oxidizing and forming a dust-like scale within minutes of when it is cleaned. For this reason it is best to have the adhesive mixed prior to removing the anodizing from the rib or if this is done first, make one final sanding pass just prior to applying the adhesive and follow steps 1 & 2. The sooner the adhesive covers the prepared rib surface the better.

4. With a wooden applicator spread the adhesive the full length of the contoured rib bottom from one end to the other. Double check to be sure you have not left any gaps.

5. It is standard procedure to use excess bonding agent as the excess will be squeezed out when the rib is installed. In fact, a ribbon of excess bonding agent should be on both sides of the rib when it is down in final position. The excess will be cleaned away when the adhesive has cured. The mistake is not to use enough bonding agent!

### **Final Barrel Preparation**

Secure the assembled shotgun, breech block in locked position, in a padded vise by its receiver and support the end of the muzzle. With a Tuluol solvent-soaked Q-Tip, clean the top of the barrel where the rib will be installed from receiver to muzzle. Next, with a dry Q-Tip wipe the same section hard. Repeat this cleaning operation twice.

You should have the following items handy on the bench: Six 1/2 inch wide rubber bands - four 6 inch long sections of pre-cut filament tape - four 12 inch long sections of pre-cut filament tape - a 3-56 or 6-48 fillister head screw and a screwdriver to match the screw slot.

The rubber bands will go over the rib and its fixture and the barrel to provide the necessary pressure. The short sections of filament tape will be used over the rib fixture and barrel to position

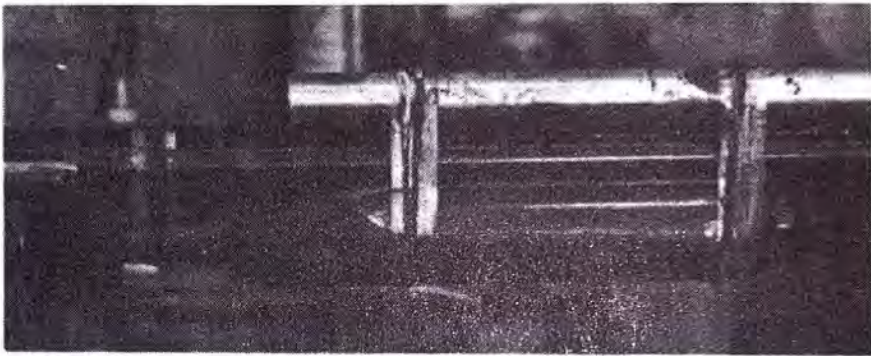


the rib in correct alignment. The longer sections of filament tape will be necessary to go over the fixture and shotgun forends for the same purpose. The 3-56 or 6-48 fillister head screw takes the place of the front sight during the adhesive curing period and allows the rib muzzle end to be pulled down snug.

### Installation

Place the adhesive-coated rib and its holding fixture on the barrel in its approximate position and as straight as possible. Immediately locate the sight clearance hole in the rib over the threaded sight hole in the barrel and install the fillister head screw. With the screwdriver, pull the rib down as hard as possible. This should always be the first step of final installation.

Next locate the correct position for the tail end of the rib and



The rib with the mixed adhesive filling the contoured rib bottom and the rib installed on the barrel for curing. Note the filament tape to position the rib and the rubber bands providing the pressure to squeeze the rib bottom contour to the barrel contour. Also note clearance between the end of the rib holding fixture and the end of the rib. This is about maximum clearance.

secure it with a piece of filament tape. Slip one of the 1/2 inch wide rubber bands over the length of the rib, its fixture and the barrel until it is directly on the tail of the rib. This is always the second step of the final installation.

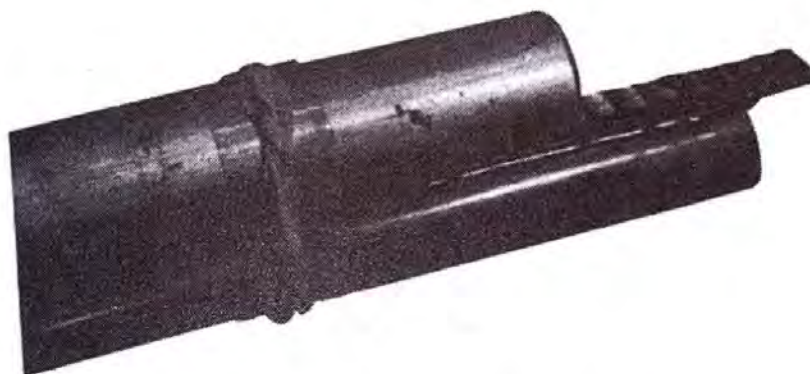
With the muzzle and tail ends of the rib positioned, it is now simply a matter of placing the sections of filament tape and rubber bands about four to six inches apart the full length of the rib and fixture. As each of these is placed in position, press down with your hands to get as close a fit as possible between the contours of the bottom and the top of the barrel.

In positioning the filament tape, start by placing the middle of the tape on the fixture or rib with the ends free. Press down with your hand and at the same time pull the tape tight and wrap it around the barrel or forend. Now pull the other end tight and check to be sure that you have not pushed or pulled the rib out of



alignment. The tape should always be as tight as possible. If the rib tries to slip to one side, pulling on the opposite side of the tape will reposition it.

The rubber bands provide the main source of pressure and should be as tight as possible. To prevent the rubber bands from not being stretched evenly and possibly pulling the rib to one side, grasp the band in the center above the fixture, pull it up about a half inch and let it pop back in place. This equalizes the pressure. It is a good idea to use new rubber bands each time you do an installation to avoid breaking when the rib is in the process of allowing the bonding agent to cure.



A close up photo of the front of the rib during curing. Note the ribbon of extruded bonding adhesive where the rib joins the barrel. Note the fillister head screw temporarily taking the place of the front sight to pull the rib down tight on the barrel muzzle during curing. In this installation the end of the rib has not been cut off - this will be done after curing. It can be cut off prior to installation if desired.

With all of the filament tape and rubber bands in position, closely examine the juncture of the rib to the barrel. There should be a ribbon of extruded adhesive from muzzle to tail on both sides of the rib. If there is a gap, push extra bonding agent into the gap.

The final check is to re-examine the tail of the rib to be sure it has not slipped out of alignment. Next lift the shotgun and sight down the assembly, being sure the rib is not canted or out of align-



Poly Choke rib on Remington 870. Installation just completed. When cured, a simple clean-up job is the final step prior to giving a happy customer his "new" ventilated ribbed shotgun.



ment. Finally place the gun in a horizontal position with the rib up and level. Allow a minimum of 12 hours curing time for the bonding agent.

### Cleaning Up

Remove the rubber bands and filament tape. Next loosen all of the lock screws of the rib holding fixture and slowly lift it free of the rib. Clean the fixture of all bonding agent sticking to it and



The first step in removing the cured excess bonding agent is to grind a Nylon Front Sight Drift Punch to the shape shown at the right. Hold flat of the chisel against the rib body while point is pressed against the barrel and pushed forward. Several passes may be necessary to clean away all excess.

leave the lock screws engaged but not tightened.

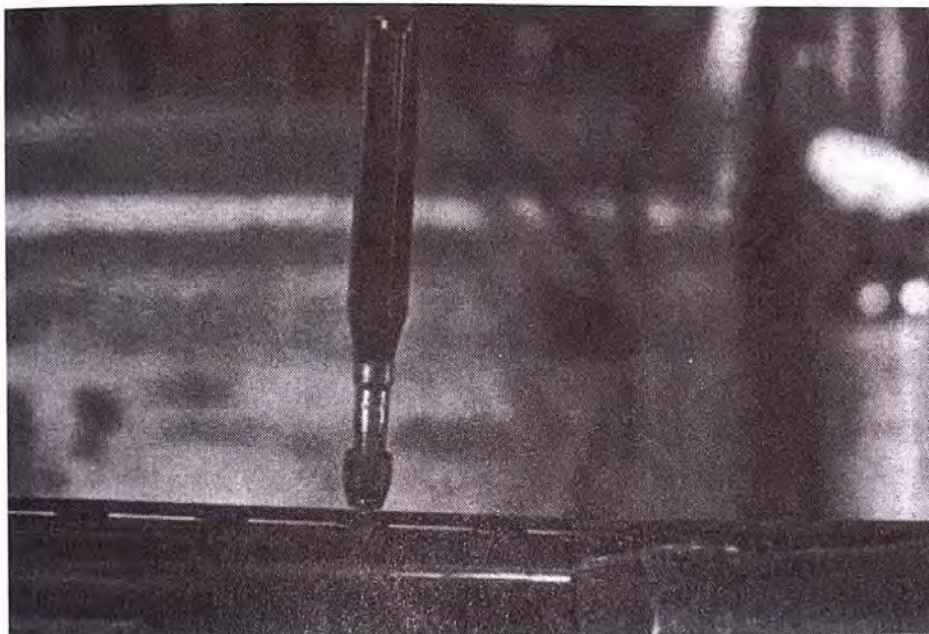
To clear the excess adhesive that has been extruded from under the rib, place the flat of the nylon chisel point against the rib, press down against the barrel and push the tool the full length of the rib. The excess adhesive will be cut free and will pull off like a long string. Repeat the operation on the other side of the rib. The nylon chisel will cut any excess adhesive free - provided the point is sharp. Again check to be sure there are no gaps where the rib joins the barrel. If one exists, mix up a small batch of bonding agent and press it in place to fill the gap.

If you have left the excess rib length protruding past the muzzle, this is the time to cut it off. A jewelers saw is the best tool for the job but a hacksaw can be substituted. The rib end should never extend past the muzzle but be flush or just slightly behind it. Use the Aluma-Hyde to recolor the dressed rib end and also to touch up any scratches on the rib body.

Next remove the fillister head screws and install the regular sight. The Poly Bradley sight should be aligned parallel with the rib. If it ends up crossways or not exactly straight, you can either file off some of the bottom of the sight or countersink the



clearance hole a small amount. Either way, the sight should be parallel and down tight. Next look inside the bore with a strong light and be sure that the sight shank is not protruding down past the barrel wall. Chances are that it will not be flush and you will have to file it flush or use a Dremel Moto-Tool with a small grind-



Using the Brownell sight installer to install small middle sight without burring it.

stone and polishing point to get it flush with the inside bore.

Use the 3-56 tap to clean out the threads for the middle sight. The Brownell sight installer will allow the tiny bead to be screwed into the rib without marring the bead or rib. Finally peel off the backing on the Poly Choke name sticker and place it in its recess in the rib.



The excess bonding agent has been cleared away, the rib cut off flush with the muzzle, the fillister head screw removed and the Poly Bradley sight installed. Note the solid section of the front end of the rib. Also note that the front upper end of the rib has been slightly beveled back to prevent dings and nicks.





Poly Rib being custom fitted to Poly Choke.

Inspect the rib from muzzle to receiver on both sides to be sure all excess adhesive has been removed, that there are no gaps where the rib joins the barrel, that the sights are in position with the front sight shank flush with the bore, and that the rib is on straight and true. A light coat of oil is the finishing touch.

As the barrel cannot be reblued with the rib installed, be sure the tag with this information is tied to the rib when you give the gun to your customer. If he has to remove the tag, chances are that he will read the information.

### **Barrels With Choke Devices**

The procedure of installing Poly Ribs on barrels equipped with various choke devices is identical to Section One except joining the front of the rib to the choke device on the barrel. There are four methods that can be used. The method chosen will be dictated by the barrel diameter, choke device diameter, length of barrel from receiver to the choke device, and the device itself. Regardless of the choice, the installation should be as neat as possible and seem to blend into and become a part of the device.

#### **Method Number One:**

This is the best choice whenever possible and will work with most choke devices such as the Poly Choke, Lyman Choke, and similar-sized devices. It consists of cutting the forward solid section of the rib to match the rear and top contour of the choke device. The solid rib section butts against the rear of the device and extends over the top of the device with the sight going through the rib into the device body.

Tighten the choke device down to the last setting. Next cut a template of the contour of the rear of the choke device from a piece



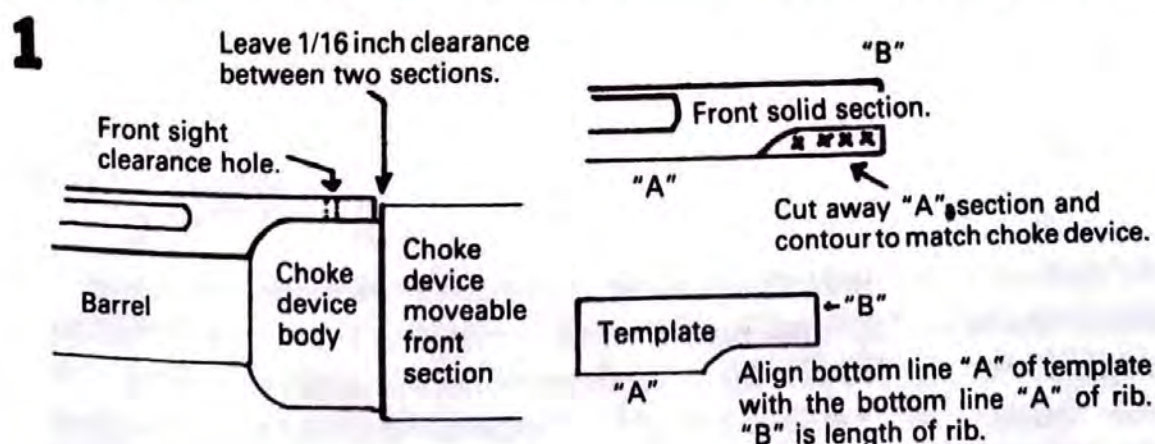
of cardboard, about like a notebook backing. The front edge of the template should be about 1/16 inch back from the movable section of the choke device. The rear end of the template should extend at least two inches back from where the choke device joins the barrel.

After determining the correct overall length of the rib from the receiver to the rear of the choke device, lay the cardboard template on the solid rib section. Align the rear bottom edge of the rib. With a sharp pointed scribe, trace the contour onto the solid rib section at the correct location. Now note the amount of rib that will be left when the unwanted section of rib is cut away. This thickness should not be less than the thickness of the top section of the rest of the rib.

If all is correct, cut away the contoured section of unwanted rib but leave the scribe mark showing. This will be shaped later when the bottom of the new section is contoured to match that of the choke device body. A jewelers saw with a thin blade is about the best tool to make the initial cutting.

The new bottom rib section will be flat and will have to be hollow ground to match the choke device contour. There are several ways to do this but a Dremel Moto-Tool with a thin grindstone will get the job done fast and accurately provided you keep a steady hand and do not try to get the job done in one pass. Remove a little of the rib at a time, checking constantly to be sure the sides are kept straight and trying the section on the choke device body for fit. When completed, the front of the rib should lie flat against the barrel and the newly contoured section should be flat and snug against the choke device body.

If you have milling facilities, the contouring of the front section can be done quickly but is not absolutely necessary. Gaps should be avoided, but if one occurs accidentally, the black adhesive will usually fill a small mistake. The bonding agent



should be placed on this new section just as on the rest of the rib bottom contour as in Part One and a fillister head screw used to

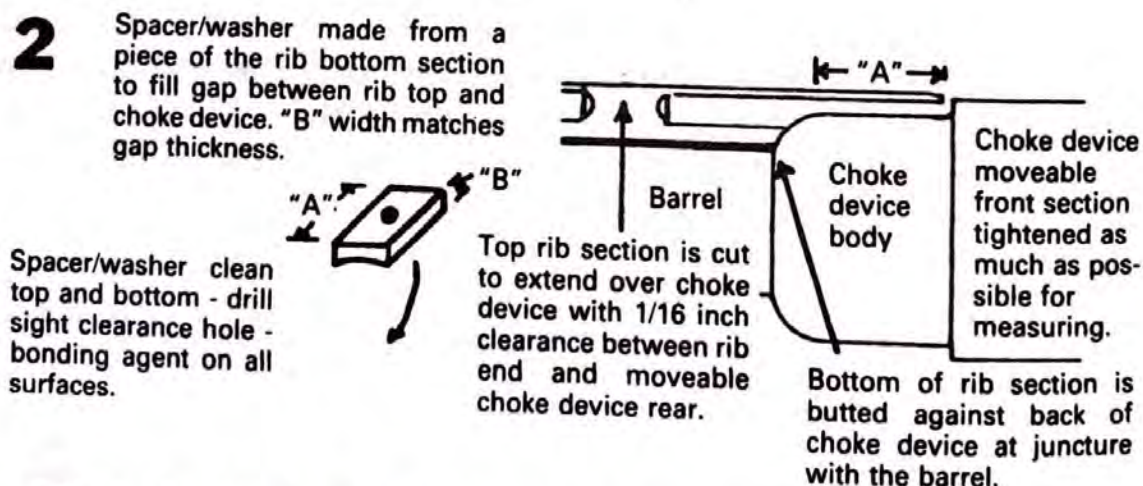


pull the front end down during curing. Many choke devices use a small ramp sight such as the Poly-Choke Bev-L-Blok. This should be replaced with the regular Poly Bradley sight as the rib height takes the place of the ramp part of the old sight.

### Method Number Two:

This is almost identical to Method Number One except the rib is cut off behind the solid section and at its front. The bottom section of rib will butt against the back of the choke device while the top section of the rib continues over the top of the choke device. This method is very useful when barrels have been cut so short that a regular rib will be too long for Method Number One.

If the top section of the rib is too thick to allow it to lie flat against the choke device body while the bottom section of the rib is in contact with the barrel, grind the underside of the rib top section as you did in Method Number One until it does lay down snugly. However, in most cases there will be a gap between the underside of the extended top rib section and the choke device body. A spacer or washer must be made to take up this space. A short section of the bottom part of the rib will usually be sufficient and has the advantage of already being contoured on the bottom to match the choke device body and flat on the top to match the underside of the top rib section extending over the choke device. If it proves to be too thick, it should be thinned on the flat section. If too thin, cut a section from the solid front part of the rib that you have discarded.

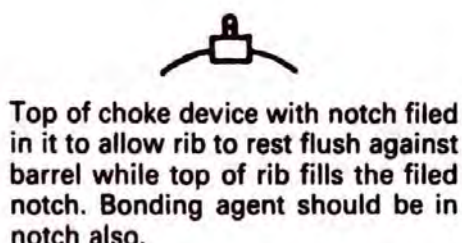
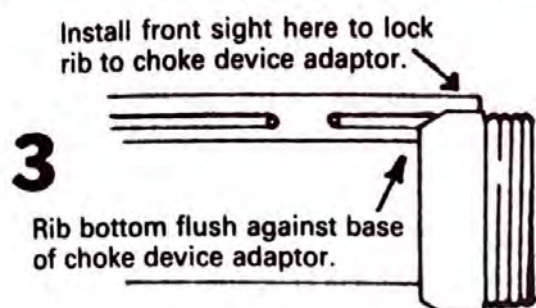


When installed, the spacer should be cleaned of the oxidized finish on both top and bottom but the sides should be left with the original finish. Naturally a clearance hole must be drilled through the spacer for the front sight. When installed, be sure that the bonding agent is on the top and bottom of the spacer and that the fillister head screw pulls the assembly down tight against the device during curing. If done properly, the spacer will be almost invisible and the front of the rib is as solid as if it were one piece.



### Method Number Three:

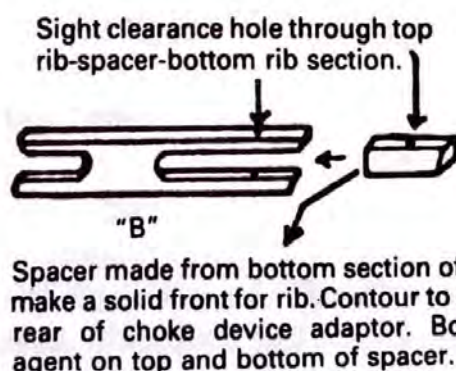
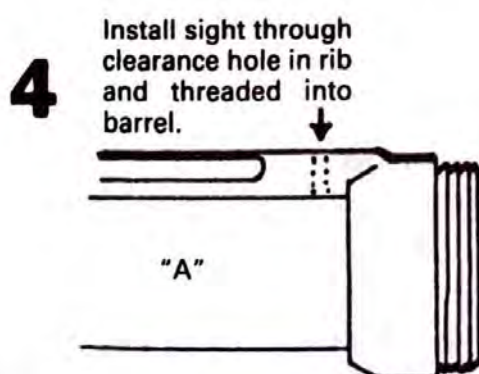
This differs from Method Number Two only when the diameter of the choke device will require the top rib section to be too thin. Remove the choke device body, leaving only the adaptor in place on the barrel. These are usually silver soldered to the barrel. Align the rib and scribe a line on each side of the rib where it meets the



device adaptor. Now mill or file a notch in the adaptor as a recess for the rib extension. The top of the rib should extend above the adaptor or at least be flush with its top. The sight is installed in the usual manner in addition to bonding agent in the recessed slot. This method requires a little extra work but will result in a very neat installation if done carefully.

### Method Number Four:

This method should be used only when one of the other three will not work. The Cutts Compensator installed on a few thin barrel guns will require this method as the Cutts adaptor diameter is quite thick.



The rib is cut off at the front at an arc to butt firmly against the back of the Cutts adaptor. If possible the cut should be made in part of the solid section of the front end of the rib or at one of the supporting posts between the top and bottom rib sections. Only as a last resort should the cut be made between two of the posts. In this case a short spacer can be made from the solid rib front section with bonding agent holding it to the top and bottom sections. While the bonding agent alone will hold the rib in place, a



headless 3-56 screw through the top rib, the spacer, the bottom section and the barrel is extra insurance.

If possible the front sight of a Cutts Compensator should be plugged and the sight moved back to the rib front. If you are using Method Number Four and the rib height is equal to the adaptor diameter, the sight can take the place of the headless 3-56 screw. If the sight will be too low because the rib is not as high as the adaptor, a Poly Bev-L-Blok ramp type sight can be utilized.

Regardless of the method chosen, take your time and make a neat job. Be extra careful in determining the overall length of the rib during the cutting. It is a good idea to cut the length just a hair too long and then file it to final length after the rib has been pressed down hard and its bottom contour matches the barrel contour.

### **Special Note:**

A customer who has agreed to having a rib installed is a good potential customer for a variable choke device. If you can install both at the same time, the measuring and blending of the two is much easier and will result in a neater job.

### **The Poly Rib Is Removable**

The Poly-Choke Featheraire Rib is made from an aluminum alloy and must be removed if the barrel is reblued. However, it can be cleaned of the old bonding agent and easily reinstalled. Also if you install a rib crooked, simply remove it and try again. While the bonding agent has 18,000 pounds per square inch tensile strength that prevents the rib from being pulled free of the barrel, the shear strength is quite low and it can cut in a special manner.

### **Removing The Rib**

The first step is to remove both the front and rear sights. Next with a flat bottomed 3-56 tap, turn the tap into the middle sight hole slowly until it contacts the barrel. Continue turning the tap slowly until the pressure lifts the rib at this point a fraction of an inch. Push the end of a foot length of fine piano wire through the clearance and under the rib. Grasp both ends of the piano wire in vise grip pliers or wrap the ends of the wire around wooden handles. With the gun receiver in a padded vise, pull the wire toward you slowly but with firm pressure. A slight see-saw action of the piano wire will speed up the process. The thin wire will cut the adhesive clean and free this end of the rib. Remove the tap, then pull the wire back toward the other end of the rib. The rib will lift off clean and undamaged.



## Cleaning Up

The old bonding agent must be completely removed from the barrel. The nylon chisel and steel wool will prepare the barrel for polishing and bluing. The contoured bottom of the rib can be cleaned just as the original anodizing, with heavy grit aluminum oxide cloth wrapped around a section of barrel. Everything must be as clean as when installing a new rib. When ready, reinstall the rib in the normal manner and use Alum-Hyde to touch up any scratches on the anodized rib finish.

## Miscellaneous

1. Regardless of how the rib is mounted, the front end should always terminate in the solid section or at least at one of the upright rib supports. If the top section is cut past a rib support and left free, a twig or other object can catch under it and bend or break the top section.

2. Ribs for recoiling barrels such as those found on the Browning Five Shot Semi-auto or the Remington 11-48 have the rear tail section contoured to clear the receiver during recoil. However, before final installation, hold the rib in place with tape temporarily and push the barrel back to full recoil position and check to assure that there is sufficient clearance. Removing the heavy recoil spring and forearm will make the check easier.

3. Most shotgun barrels have a basically similar contour from breech to muzzle. Quite often a Poly Rib can be slightly recontoured on the bottom section to fit an odd model barrel. To check, lay the top of the rib on a flat surface with the contoured bottom up. Remove the front sight from the odd shotgun barrel and place it bottom side up against the contoured rib bottom. Bend down and look closely from breech to muzzle at the juncture of rib and barrel. Any contour deviation is easily seen. Sliding the barrel back and forth about one inch may solve the problems completely and provide a perfect match. Minor contour variations can be changed by careful reshaping with a round file or grindstone in a Dremel Moto-Tool.

4. Short sections of a Poly Rib can be used on handguns and normally all that is needed is the bonding agent to hold them in place. The 20 gauge rib is slightly slimmer in overall thickness and will make the neatest job, but any section can be utilized. Poly Ribs can be used on high powered rifles but due to the amount of barrel whip it is best to tie the rib down at the front and rear with headless 3-56 screws. In this type of installation both the rib and the barrel are threaded at the same time after the rib has been installed and the bonding agent has cured.



### A Final Few Words

Normal installation time should be about one half hour or even less after a little practice. As your rib installation business increases, purchase extra rib holding fixtures so that you can do more than one installation at one time, thus further speeding up the time for each rib.

Keep a record of the model and barrel lengths of the ribs you use in your area. This will allow you to keep the most popular ribs in stock and prevent investing money in ribs that do not sell rapidly. Study the interchangeability list as you will quite often have a rib on hand for one model shotgun that can be used for a customer who wants a quick job. Again it is a matter of knowing your product.

Adding rib installation to your gunsmithing service provides not only new customers but will also help bring in additional work such as rebluing, stock refinishing etc. The amount of rib installation business you receive will depend to a great extent on satisfied customers for word of mouth advertising is the best form of advertising.

**DO A GOOD PROFESSIONAL INSTALLATION JOB EACH TIME.**

### POLY-CHOKE RIBS INTERCHANGEABILITY LIST

NO.	GAUGE	GUN	INTERCHANGE	NO.	GAUGE	GUN	INTERCHANGE
96001	12/16	Beretta Pump	Win M-12, 12/16	96021	12/16	Remington 11-48	Sav. 775,
96001	20	Beretta Pump	Win Mod 12, 20				Tradewinds H-150
96030	12/16	Browning Auto 5	Rem 11-48, 12/16	96021	20	Remington 11-48	Sav. 775,
06030	20	Browning Auto 5	Rem 11-48, 20 ga				Tradewinds H-150
96019	12/16	Daly Auto Pointer	Rem 1100 12/16	96016	12/16	Remington 870	Rem 58 12/16
96019	20	Daly Auto Pointer	Rem 1100 20 ga	96016	20	Remington 870	Rem 58 20 ga
96019	12/16	Diawa	Rem 1100 12/16		20	Rem. 870 Ltwt	
96019	20	Diawa	Rem 1100 20 ga	96019	12/16	Remington 1100	Diawa
96062	12/16	Franchi Auto	Ithaca 5KB	96019	20	Rem. 1100, Std.	Diawa
96062	20	Franchi Auto			20	Rem. 1100 Ltwt	
96055-612/16		H.S. Flight King	Pump and Auto	96021	12/16	Savage 775	Rem. 11-48 12/16
96055-620		H.S. Flight King	Pump and Auto	96021	20	Savage 775	Rem. 11-48 20 ga
96062	12	Ithaca 5 KB	Franchi 20 ga	96021	12/16	Tradewinds H-150	Rem. 11-48 12/16
	20	Ithaca 5KB		96021	20	Tradewinds H-150	Rem. 11-48 20 ga
96040	12/16/20	Ithaca 37		96001	12/16	Winchester 12	Beretta Pump
96061	12/16	Marlin 120	Win M12 12/16	96001	20	Winchester 12	Beretta Pump
96061	20	Marlin 120	Win M12 20 ga	96002-312/16		Win. 1200/1400	
96016	12/16	Remington 58	Rem. 870 12/16	96002-320		Win. 1200/1400	
96016	20	Remington 58	Rem. 870 20 ga				

NOTE: The numbers found on the bottom of ribs are for identification. Example - No. 96019-12-17 (or 19-12-17). The "96019 (or 19)" indicates gun rib is for (in this case Remington 1100); The "12" denotes 12-gauge; "17" is number of vents in rib (does not pertain to length of rib).

- *Ralph Walker and The Crew at Brownells*



## CHAPTER 3

### SCOPES & SIGHTING



"... AND YOU WANT THE SIGHT WHERE ?? "



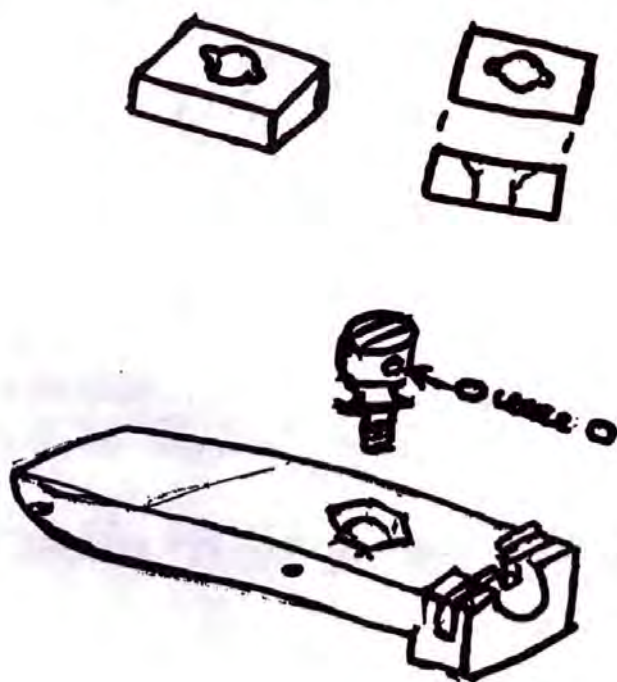
## DETENT BALL FOR MICROMETER SIGHT

Ever lost the little detent ball out of the Colt Accro, or for that matter any micrometer sight? Well, you're using one when you write your order for the new one with that ball point pen. I find that the one from the broad point is just right for the Accro, so don't throw away those old refills. A ball out of a grease fitting works sometimes, but they are darn sure harder to get out! You have to be a real contortionist to get the ball/spring/ball into the screw and that into the sight, so not being one, I borrowed Mama's mop pail to put it together in. Now when I fail the first time, I don't have to crawl around the floor of my shop with a flashlight and magnet to find the parts. (For me, don't know which of these two is the greatest... but one thing's for darned sure, that mop pail Kink-plus an old towel in the bottom to stop the rebound-is going to save untold wear-&-tear on my knees, belly and patience! Bob B.)

*- Dave Hepler, Point Mugu, California*

## REASSEMBLING REAR SIGHTS

Did you ever try to re-insert that little spring and the two little balls in the target rear sight of a .357 Colt or the Mark III A.C.P. after replacing the easily-broken elevating screw? Having only 2 pair of hands and no way to get close enough to use them, I made a little block of steel the same width of the body of the screw. (I ain't got no sight nor measuring tools here so am writing from memory.) With a small rat-tail file, make 2 opposite, semi-circular, tapered grooves to funnel in the 2 balls and spring, then hold this block on top of the sight and push the elevating screw





with balls and spring on down until the screw, with balls and spring are contained in the sight base and insert the retaining pin. If you don't have any spare parts, better do all this inside of a cigar box or you will never find the parts if they get away. With the screw part way in the steel block, the spring centered in the screw and a ball at each end in line with the filed, tapered grooves, pushing down on the screw funnels the balls into the body of the screw so it can be inserted in the sight base.

- M. C. Ray, Cleveland, Ohio

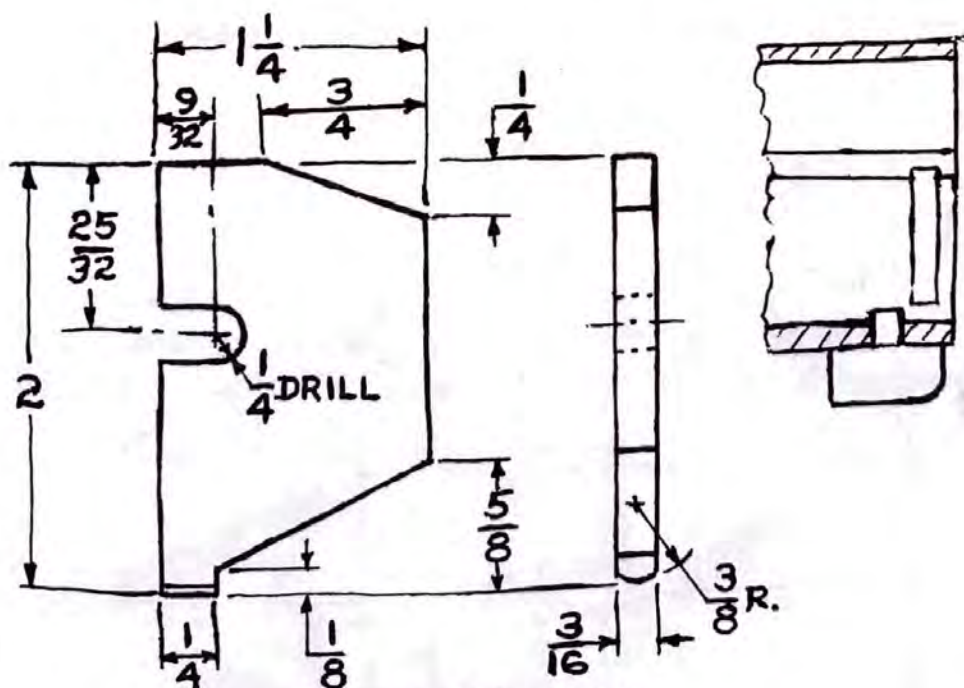
### DOVETAIL SIGHT TIGHTENER

Have a loose sight in a dovetail slot? I have always found it best to peen the dovetail on the sight, rather than peening the slot. I always like to work on the cheapest part if I have a choice.

- Ken Jenkins, Ithaca, New York

### INSTALLING .45 AUTO FRONT SIGHTS

The best way that I have found is to use a  $\frac{1}{16}$ " diameter wheel in the hand grinder to cut a recess inside the .45 ACP slide about  $\frac{3}{16}$ " wide by  $\frac{1}{32}$ " deep below the shank of the original front sight. This makes it easy to then grip the old sight tightly in a vise and lift the slide up free from the sight. Then file the hole in the slide to fit the new sight, press in the new sight, grind off the excess shank leaving about  $\frac{1}{16}$ " of shank projecting inside the slide. With the punch shown on enclosed sketch, peen the sight in place with the slide upside down on a steel block, then flow silver solder to fill the previously ground recess inside the slide. "Hi-Force 44" silver



TOOL STEEL - HARDEN and DRAW

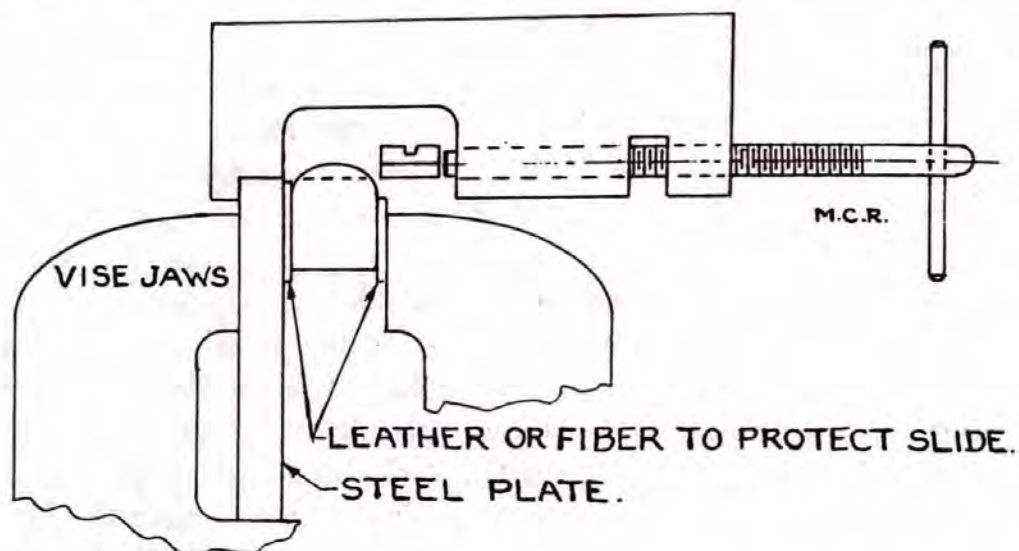


solder fluxed with No. 4 Comet Flux will flow down the shank of the sight by capillary action. I have never had one come off when installed in this manner. Clean the bluing from the shank of the sight and put a drop of flux on the shank before peening. If carefully done, the slide will not have to be re-blued.

- M. C. Ray, Cleveland, Ohio

### SIGHT BLADE PUSHER

Enclosed is a drawing of a modified Williams front sight

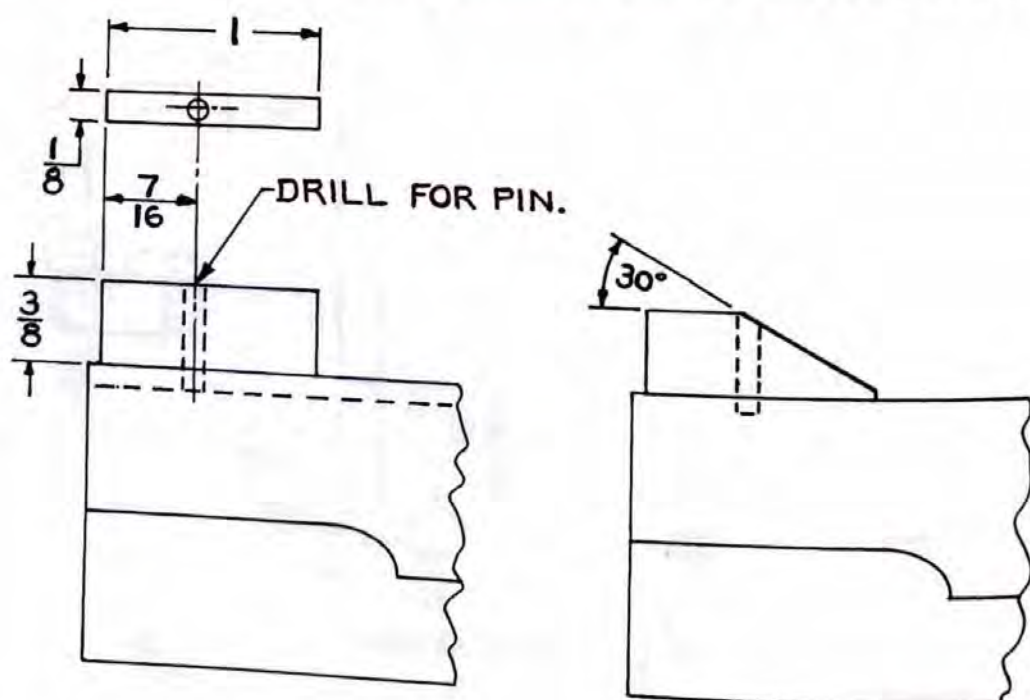


pusher so you can use it for installing pistol sight blades. (This one's really nice for .45's. Bob B.)

- Glenn Sieben, Long Beach, California

### SHOOT-OUT PROOF FRONT SIGHT INSERT

I have a hint for those gunsmiths that want to put a ramp





sight with an insert in a .45 Auto slide. This type of ramp helps reflect light and is also real sturdy, as I never have had one shoot off.

Take a piece of  $\frac{1}{8}$ " x  $\frac{3}{8}$ " x 1" ramp stock and drill a hole in the center for the size of brazing rod you are using in your shop. With a  $\frac{1}{8}$ " wide sight I found that max. diameter for this would be  $\frac{3}{32}$ " diam. Place the hole in the ramp so that the center is where you want the ramp to center out. Clamp ramp stock on slide and drill a hole in the slide for the rod. Then solder the ramp with rod in place to the slide.

Finally, shape front sight so that the angle of the ramp meets the top of the sight at the center of the rod. I found that this type of insert reflects real well.

- Max Mitchell, Leesville, Louisiana

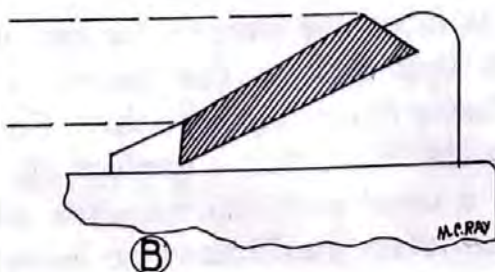
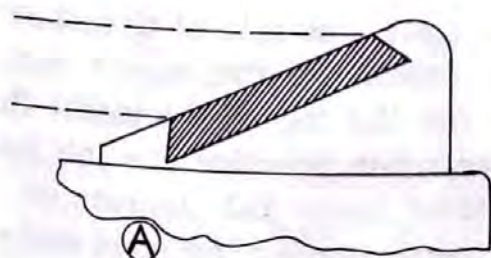
### STILL WATERS...

Like that old whizzer about the unusually quiet and bashful fellow working in a downtown office. Never talked unless spoken to and always blushed when answering. His asking for time off to get married was a traumatic experience. A couple of months later he came to work and rather than dig in as usual he just sat and stared at the ceiling. At 11:00 he shot out of his chair and announced to one and all, "we are going to have a baby - tell the boss I'll be back," and took off like a turpentine cat. Well - two months married and a baby already yet!! In three hours he drug back into the office, redder faced than usual but with an unheard of (for him) silly grin on his face. Under the circumstances nobody dared come forth with the usual comments and observations. Finally the boss' curiosity reached the bursting point and he called him into his office. "Okay," said he, "what was it, boy or girl?" The young fellow looked at him in utter amazement. "Boy or girl? Lord, we won't know for another nine months."

- Bob B.

### HI-TOP FRONT SIGHT INSERT

Here is something I want to share with the trade about your plastic handgun front sight inserts. On Colts or any other handgun





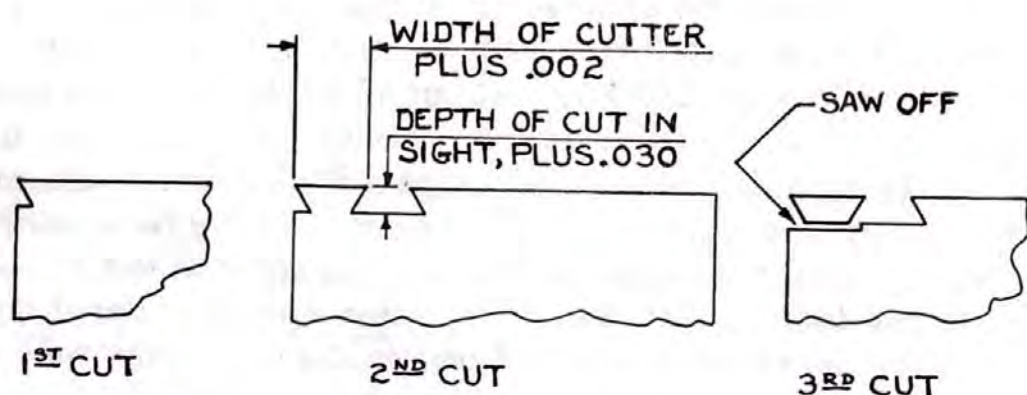
with a ramp at a low incline from the horizontal, there exists the problem of an extremely foreshortened view of the ramp and the consequential poor sight picture that it produces. This problem exists in spite of the insert because of the extreme foreshortening. A practical solution to this problem is to raise the angle of the incline of the insert itself above the incline of the ramp. Instead of milling the insert flush with the top of the ramp like shown in drawing "A", raise it above the ramp as shown in drawing "B".

This results in a fuller and more direct view of the insert and I hasten to point out that this does not destroy the aesthetic appeal of the gun or of the sight. In fact, I think it enhances it.

- Tony Imbronone, Taylorville, Illinois

### EASY WAY TO INSTALL PLEXIGLAS FRONT SIGHT INSERTS

I am very pleased with your front sight insert kit and I wanted to let you know that I found a much simpler and easier method of installing the plexiglas. Pad the drill press vise and place the gun at the proper angle to a 60° sight base cutter. Now



just adjust cutter to the desired depth and with compound table, feed cutter through sight. Next, put the plexiglas material on edge in the drill press vise, and adjust cutter depth to .030" more than depth of cut in the sight. Feed the cutter through the plexiglas for a perfect cut, then feed the table across to a few more thousandths more than the width of my cutter and make another cut. Saw the plexiglas off at the bottom, which is the top of the insert when inverted.

It is now a simple matter of filing off a couple of thousandths from one end of the insert and pressing in the insert with a Williams front sight pusher. Finally, file the top of the insert flush with the sight for a perfect fit. After some practice the job takes only a total of 20-30 minutes. (One point Jerry did mention on the phone later; you'll have to have 2 cutters, one for the steel and one



for the plastic. Once you've cut plastic with the Sight Base Cutter it just loses interest in cutting steel very fast or very well. Jerry also reports that since folks have found out that he can do insert jobs, they are coming in at an unbelievable rate. The first couple of jobs paid for the kit and the rest have been gravy. Frank B.)

- Jerry Banfield, Glenarm, Illinois

## ACRAGLAS FOR FRONT SIGHT INSERTS

Another use I've found for Acraglas is for colored revolver and pistol front sight inserts. The formula that I found to work quite well is as follows:

4 Drops Resin

1 Drop Hardner

2 Drops Fluorescent Kids Model paint (any color you want)

Use pieces of waxed paper cold drink cup as side forms to hold the Acraglas in place until it sets.

- Harold Davidson, Jr., Merrillville, Indiana

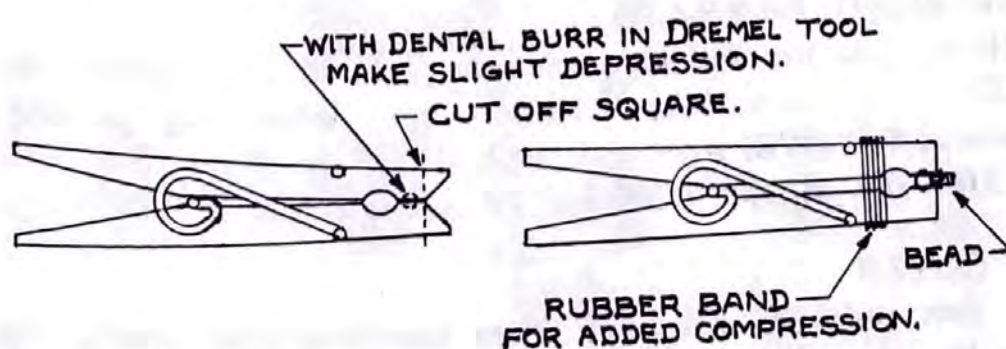
## REVOLVER SIGHT BLADES

The outline is easy enough to file to shape, but the right thickness is tough. Sometimes I'm fortunate enough to have some flat stock the right thickness around, but most times I have to file the darn thing until it will push-fit in the slot. Now comes the easy way! Take some bar stock about 1" square (at most 2") and you can make several blades at a time. Very Accurately measure the slot width. Add .002 or .003 for a snug fit and cut your own piece of stock with a cut off wheel. (Like cutting a slice of bread off a new loaf of Mom's homemade.) Now just file or grind the "slice" to shape, press-fit or solder in, and the revolver is ready to go with the repairs made the easy way.

- Marty's Gun Shop, Elko, Nevada

## CLIP-ON SHOTGUN SIGHT INSTALLER

Here is one way you make some shotgun sight installers if you



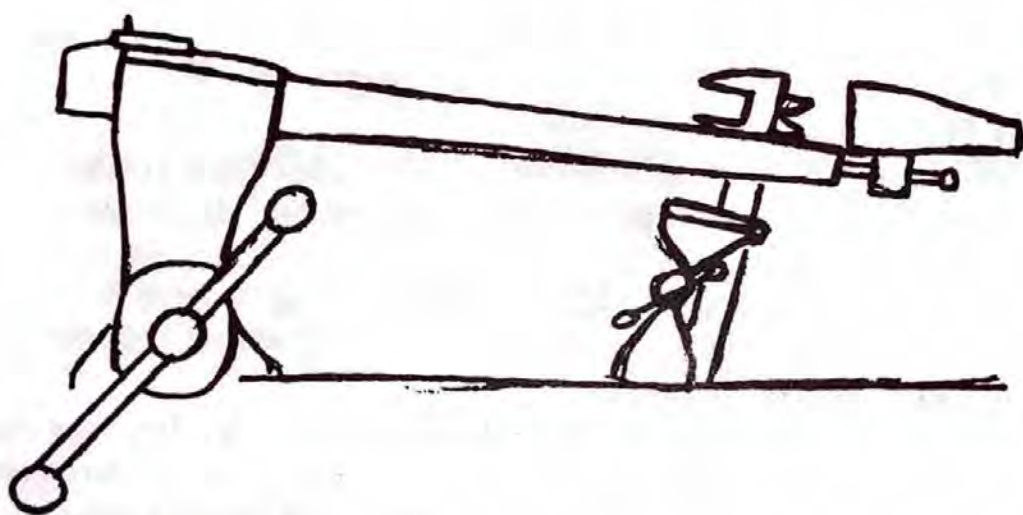


don't have a set as shown in your catalog. The drawing is pretty much self-explanatory.

*-Jim Davis, Folkston, Georgia*

## DIRECT READOUT FINDS FRONT SIGHT HEIGHTS

I came upon a "sticky" problem recently in sporterizing a Lee Enfield Jungle Carbine. After removing the flash hider and 1½" of stepped barrel I had to come up with the proper ramp/sight combination to match the original rear sight as he didn't want to



spring for a new rear sight. I solved the problem by mounting the barrelled action in the vise, which was swung around to span the workbench. I then mounted a dial caliper in a smaller second vise, and adjusted it so the bottom jaw of the caliper on the I. D. reading side was just touching the top of the barrel at a point where the new front sight was to be placed. With a collimator in the bore, I adjusted the caliper, using the top jaw as my front sight, until I had the proper sight picture. With this overall ramp/sight height it was just a matter of going to one of the charts to come up with the proper ramp/sight combination.

*-David Hepler, Austell, Georgia*

## QUICK SIGHT RAMP JIG

Here's one for the boys that don't have your ramp front sight installing jig. Just use a small size lathe dog padded with aluminum foil. (Will work too! Bob B.)

*-Mike Thompson, Kalispell, Montana*

## FOG COVER

I just recently got back from the first real fishing trip I've taken in years. Spent it with Gene Arnaud on Table Rock Lake,

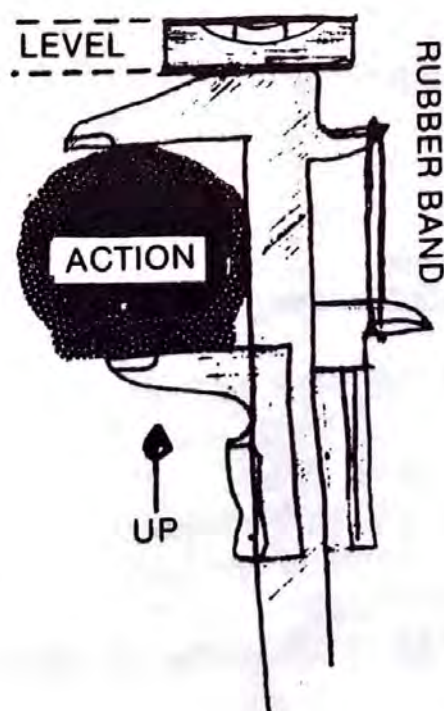


Branson, Mo. Gene is a brother gun fixerupper, gun aficionado and bass fisherman supreme. We went out several times together so's I could show him how we fish for bass in Iowa and he could show me how to catch bass. Being late fall we got some fog and one morning it was so heavy you couldn't tell water from sky, and the only reason you knew you were in a boat was because you'd climbed into one earlier and hadn't climbed out of it yet! It deterred us not as we were casting to the fish "rises" but not being able to see them rise, we were doing like some of those "dude" hunters who get a lot of good "sound" shots, but we were shooting our lures towards the sounds of fish rising.

There was one helluva racket off to our left and Gene says, "Let 'er rip" and I "let 'er rip". The strike was almost instantaneous and that creature jumped like no fish I'd ever tied into before. Without going into the usual magazine-type-description of the raging battle between man and his catch, I brought it to boat. Its location in relation to the boat seemed queer but in heavy fog, who knows up from down, anyhow? Gene gave a mighty overhand swing with his landing net and snagged it first swoop. Catching his breath and giving it a good look, says he, "My Gawd, you just caught Miss Anna Belle's prize Dominicker hen." We got out of the boat, walked up to the back door, apologized for what I'd done, paid for the fowl, had coffee and yakked a bit with her kids. After the fog lifted we loaded the boat onto her old man's truck and drove back to the lake. Heaviest fog I've ever boated in.

- Bob B. and Gene Arnaud, Branson, Missouri

## LEVEL LOCATOR



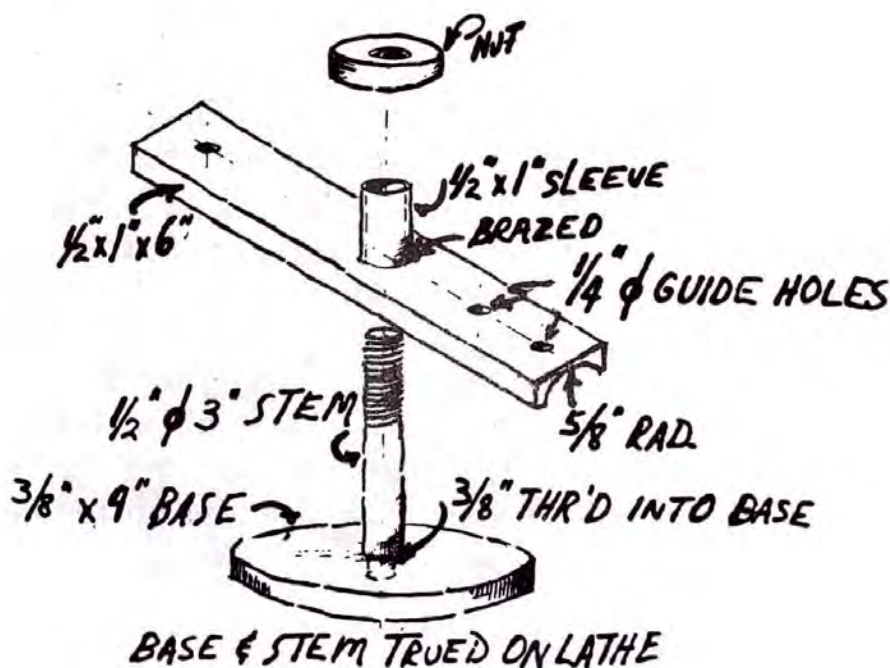


This is a good way to locate top center when mounting scope bases or sights on flat-bottomed rifle. Barrel is clamped in vise and caliper set up as shown, using level as shown. The rubber band keeps the tension. Receiver is rotated until it is level and vise is tightened down. Scope sight base may be inserted between top of receiver and caliper and scribed.

- Ted Williams, Calgary, Alberta, Canada

### SCOPE MOUNT DRILL JIG

I made up this scope mount drill jig for bolt action rifles from odds & ends around the shop. The action is slipped onto the stem



so the rails rest on the plate; the drill guide bar is slipped onto the stem and rests on top of the receiver. The guide holes are spotted correctly and the nut is then screwed down. If the jig has its parts all squared off properly & the sleeve is a snug fit, it has got to put those holes on the money.

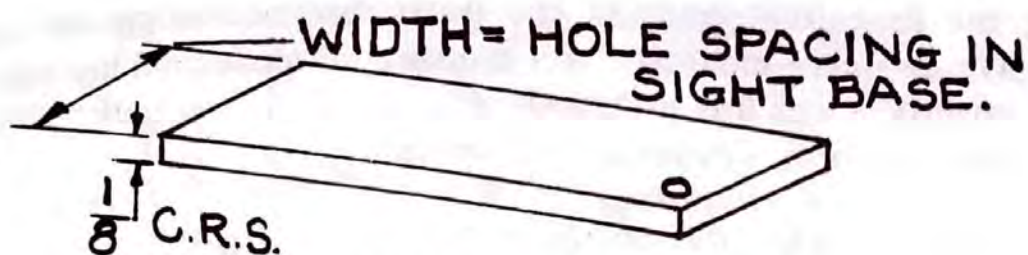
- Larry Hauser, Eugene, Oregon

### HOLE SPACING GAUGE FOR SIGHT JIG

I use a strip of  $\frac{1}{8}$ " cold roll steel as a gauge to set the hole spacing for my scope jig. It is especially handy when the base I'm mounting has nonstandard hole spacing. Just grind or file the steel strip to duplicate the distance between the hole centers or edges (same thing) in the sight base.

To use, place the barreled action in your sight jig, then drill





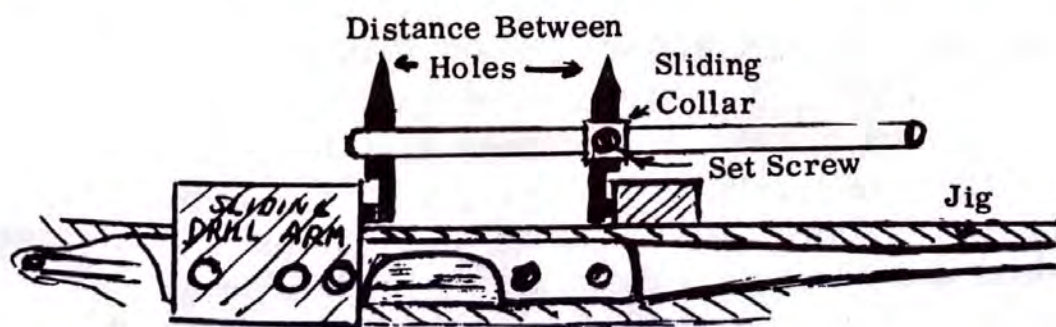
### SPACER FOR SCOPE JIG.

and tap the first hole as you would normally. Be sure that the small moveable cross arm block is placed against the cross arm and securely locked in place. Now, unlock the cross arm and fit the gauge between the cross arm block and the cross arm. Tighten the cross arm lock and drill and tap the second hole. The only way you can goof is to grab the wrong spacer! Be sure to mark your spacers.

- Kenneth Mollohan, Freeport, Pennsylvania

### FORSTER SCOPE JIG ADAPTOR

This is the gunsmith's best friend. To think of the years I eyeballed my scope jobs, the tears I shed and the profusely dripping sweat. Most of my jobs are now so accurate that one needs to move the reticle on the borescope just a minimum. Some even line up without adjustment. However, it spaces only for Weaver type top mounts. For the others I've made a jig. It consists of a bar with two points - one movable - the end opposite the point being ground to a flat  $\frac{1}{2}$  of the diameter of the rod used which is used as a caliper between the movable stop and the drilling arm of the jig.



### To Use Locating Tool -

Determine location and drill the first hole at the front of the receiver. Then drop one point of the gadget in the mount corresponding to the one drilled in the receiver & adjust the other point to drop into the mount hole to be drilled. Now, release the drilling arm and using the back of the gadget as a caliper, locate the arm for the next hole. . . etc., etc. till you have all the holes drilled,

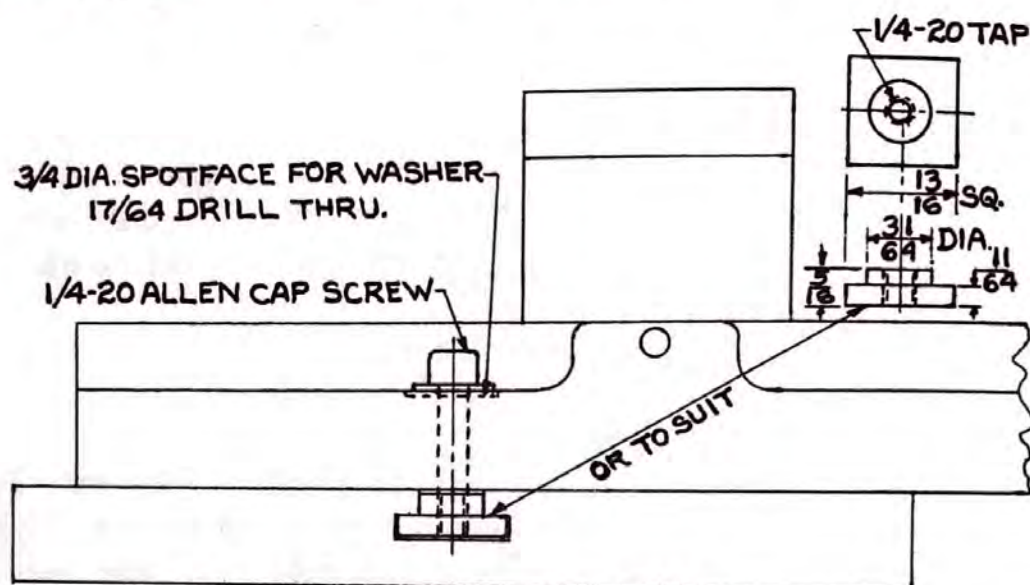


using the first front hole as the index for measuring the other holes. On one-piece mounts it works like a dream and is accurate to .002" or .003" - which is pretty close!"

- Francis Green, Cheyenne, Wyoming

## FORSTER JIG AND COMPOUND TABLE SET-UP

This is the method I came up with to mount my Forster sight mounting jig on my Atlas compound table. Now I can simply



FORSTER SIGHT JIG MOUNTED ON  
TABLE OF UNIVERSAL COMPOUND VISE.

remove the vise jaws, slip the jig on the table with the square locking plate in the "T" slot, snug down the 1/4-20 cap screw and I'm ready to go.

- David Rose, Farmington, Arkansas

## MOUNTING SCOPES PARALLEL TO BORE AXIS

After installing a good many scopes, I've come to the conclusion that most barrels and receivers just don't line up with the axis of the bore parallel with the top of the receiver. So, I set up the barreled action in my scope jig, and then putting the scope in the rings and the rings in the base, I set it into position and line it all up to the axis of the bore by sighting in on a bore scope mounted in the muzzle. When I am sure that I am going to be able to get everything in line, I clean off the top of the receiver and bottom of the base with denatured alcohol or trichloroethane, and Acra-Weld the mounts in place and secure with surgical tubing for at least 24 hours. Of course, you've gotta be careful and "give it one more check" after the tubing is in place to be sure nothing has slipped.

The next day I remove the scope and rings from the bases, and drill and tap the receiver through the bases. Never had a base



come off, and this method eliminates the need for shims.

- Gary Cleland, Swanton, Ohio

- Ray Murphy, Ft. Wayne, Indiana

## RIVETS FOR STRIPPED-OUT SCOPE MOUNT HOLES

I had a Browning Auto 5 brought in the shop by an amateur machinist that tried to mount a scope on the receiver to make a slug gun. Although the holes lined up well, the threads on the first three holes pulled out. He wanted these holes plugged but unfortunately there were no threads left even for a 6-48 plug screw.

I attempted to press in some pins, but they wouldn't stay fast due to the thinness (about  $\frac{1}{16}$ " ) of the metal. Finally, I drilled the holes out with a no. 24 bit to create a press fit for a  $\frac{5}{32}$ " pin, then chamfer both sides, leaving about a third of the hole walls.

Next, I made rivets from a piece of  $\frac{3}{16}$ " drill rod with the head beveled to match the chamfer and tapped these into the receiver from underneath. Set the action over a block of steel (to serve as an anvil) and peen the rivets down on top. The rivets were then ground off flush, inside and out, and then polished.

- Gordon Mulholland, Streator, Illinois

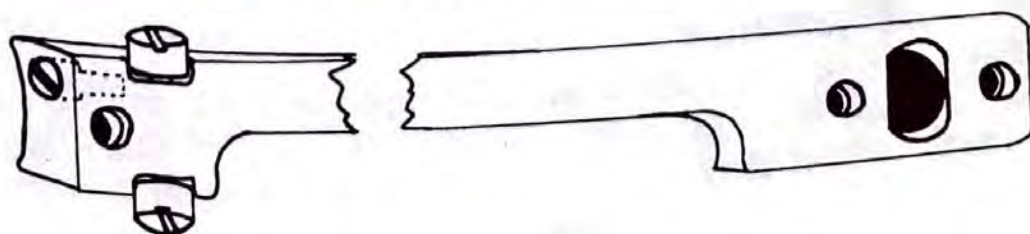
## THE LAWS IN OUR LIVES

The more a man works, the more he realizes that what he does seems to be governed by certain mystical, unalterable laws: - MURPHY'S LAW: If something can go wrong, it will... WEIL-ER'S LAW: Nothing is impossible for the man who doesn't have to do it himself... CHISOLM'S LAW: Anytime things appear to be going better, you have overlooked something... FINAGLE'S LAW: Once a job is fouled up, anything done to improve it makes it worse... CRANE'S LAW: There is no such thing as a free lunch... LAW of A. NONNY MOOSE: Never eat prunes when you are hungry.

Fred Moulton, Washington, D.C.

## SCOPE BASE WINDAGE SCREW LOCK

This can be used on any of the Redfield-type bases either one or two piece. I use the same 5x44 allen head screw as used in Red-





field Rings. I came up with this when some of the fellows wanted to take their scopes off and reset them without going to the expense of the German claw mounts which run about \$150 a set now. Once the scope was off I didn't want the windage screws to move, and the little 5x44 set thru the rear to bite on the big windage screw seems to hold real well.

- M/Sgt. W. C. Morrow, APO, New York

### SCOPE BASE SHIM STOCK

When I need a shim for mounting a scope, I just cut a piece of that tough black plastic/nylon strapping tape that comes around boxes to keep them from busting open in shipment. Cuts easily with shears, punch the holes where you need them with a leather punch...and it's even already black so it matches the blued receiver or barrel. Really works slick! (Sometimes these kinks get so clever it's hard to believe that we've walked by a particular thing as many times as we all have and never thought of it! Bob B.)

- Dick Corbett, Las Vegas, Nevada

### RECYCLED TAPE MEASURE SCOPE SHIMS

I have used discarded tapes from 1/2 inch wide roll-up type tape measurers for scope mount shims. They are contoured and fit most receivers, and can be drilled and blued to fit most bases. They are very uniform in thickness and easy to cut or break to length.

The rulers from 1/4 inch tapes can be used as shims under target scope blocks.

- Doug Fields, Arvada, Colorado

### DOUBLE-TAPE SCOPE JIG

Had to install a scope on a Model 1100 Remington for a customer and couldn't get the base to sit on that curved surface while I got the whole thing lined up. Used some of that double-faced rug tape and it held everything beautifully while I got all the holes lined up. I used the same technique a couple of days later on a Mauser and again it worked great.

- M/Sgt. W. C. Morrow, APO, New York

### SCOPE RING WRENCH

When mounting Redfield mounts and rings or similar styles, mount the base first, then remove the top half of the rings and place them so that they may be returned to the correct lower half ring later on. Put the front ring in its recess in the base and turn finger tight. Then lay a 1" diameter by 8-10" long brass bar in the



front ring and with slight downward pressure on the ring twist it into position. (Note: 1" dia. Tenite II Rods work nicely, too. F.B.) Should the ring require more pressure, place the top part of the ring onto the lower half so as not mess it up.

Put the rear ring on and use the bar to check alignment of both rings. Rotate the bar slightly and slide it back and forth. Naturally, if the rings are not in alignment, the rod won't slide. Adjust the front ring slightly to bring it into proper alignment. I use this method exclusively when mounting scopes because I don't think they were designed to be used as pry bars.

- Paul Smeltzer, Fresno, California

## STOPPING SCOPE MOVEMENT

We dust the inside of all scope rings with a small amount of your 600 grit carborundum flour with a Q-tip before screwing down the top half of the ring. Not even the .378's will move a scope under extensive firing, even when a cheap set of rings is used.

- Warren Girard, Shelton, Washington.

## TAP-IN SCOPE ALIGNMENT

Over the years I've installed more scopes than I care to count and lately I find in installing some of the inexpensive scopes it is sometimes hard to get them zeroed in. After aligning the crosshairs with your collimator, if you'll give the scope or mount a few light taps with the handle of your screw driver you'll find that the crosshairs have shifted - sometimes a considerable distance. I often re-align them as many as three or four times, tapping the scope in between each alignment until the crosshairs cease to move when you tap the scope. You can imagine on a heavy recoil gun what would happen if the hairs on these scopes weren't aligned by this method.

- William Tebay, New Castle, Pennsylvania

## SIGHTING IN

Man came into the shop with a 6X scope in hand: no gun, no mount, just the scope. Handed it to me and says he wants it sighted in at 150 yards. Now just how are you supposed to cure that? I thought we had elected all of them to public office so that we could keep them in one bunch, and here they are walking the streets again.

- Clifton Blundell, Alice, Texas

## NIGHT-TIME BORE SIGHTING

The method of picking out an arbitrary point and aligning the bore and sights with it is not too precise and will only get you on



the paper if done carefully. . . There is a way to use the standard procedure, however, and attain exceptional results: bore sight at night! By doing it after dark and using a light as your aiming point you can align the light in the bore by getting an even "halo" around the center light. This tells you if the bore is off target-center to the slightest part of a degree. Then your centering of crosshairs, apertures, etc., is very easy and precise by centering the light in the aperture or quartering it in the crosshairs. . . do it in a dark room using a street light.

- William Radtke, Denver, Colorado

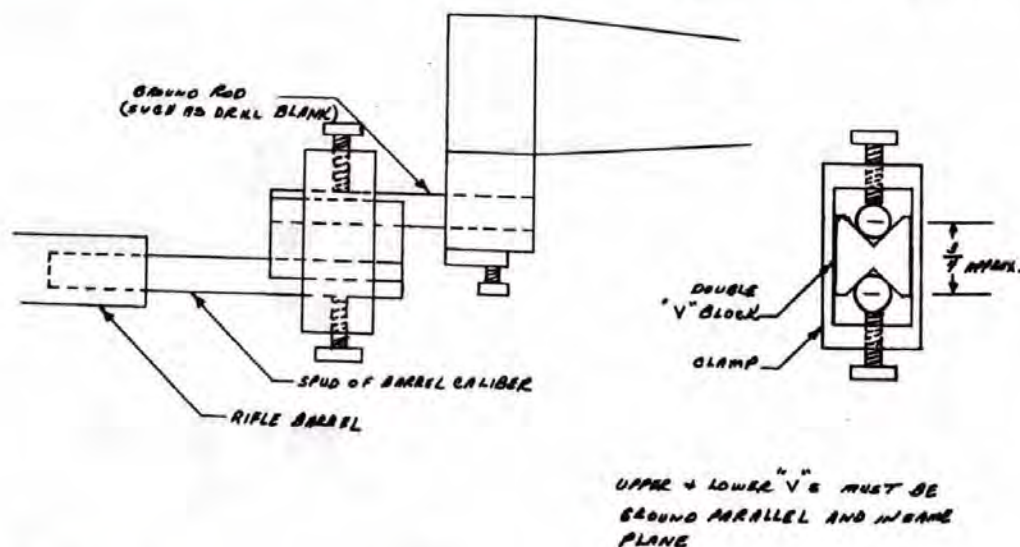
## ECONOMICAL SHOTGUN BORE SIGHTING

Years ago I always bore sighted using an unprimed case in the chamber and "sighting" thru the primer flash hole. Well I just finished putting on a "Quik-Point" and as it is "this time of the year" again, it is Rush, Rush, Rush. I thought of my old way of doing it, so I took an unprimed 12 ga. empty and did a beautiful job of boresighting that I'll bet on - can save the rest of the gang money and time too -.

- El Rancho Gun Shop, Mequon, Wisconsin

## BORE SIGHT ADAPTER FOR SEE-THRU MOUNTS

An adapter is needed to bore sight scopes mounted on any of



the see-thru mounts. I finally made up an offset adapter of approximately  $\frac{3}{4}$ " and it works just fine. The only critical parts are the upper and lower "V" 's which have to be machined both parallel and in the same plane. My drawing gives all the dimensions for the brethern.

- Tommy Munsch, Prior Lake, Minnesota



## SCOPE CROSSHAIR ALIGNMENT

Often a customer who buys a scope mounting job will want the cross hairs "optically centered" in the tube, and the windage set using the base adjustments on those like Redfield and Buehler. This, of course, will allow him his full range of turret adjustment when he sights-in on the range.

Our shop has found the easiest and fastest way to do this is to use a collimator. Once the collimator is fixed in the bore, turn the windage adjustment through its full range and note where the crosshair stops on both sides of the collimator grid. Then, split the difference and set the crosshairs in the middle. Any final adjustment can be done with the base adjustments. This trick is especially useful when mounting scopes that have been used previously on other rifles.

*- John Herold, High Point, North Carolina*

## MOUNTING BUSHNELL PHANTOM SCOPES ON RUGER MARK 1

I have found no better way to mount a Bushnell Phantom scope on a Ruger Mark 1 than by using the Brownell Dove-tail Scope Base, 1 inch size. Two 8 x 40 holes are all you need, and butt the base against the rear sight. Just in case, I always use a little Acraglas to cement the base on. The scope can be removed by loosening the allen screws, and can be replaced with hardly any change of impact.

*- Darrel Harrison, Sunburst, Montana*

## TWO-PIECE BASES FOR THE OLDER .22S

The dove-tail scope base on those untapped older .22s is great, but many won't take a one-piece top base, like the one you offer. I drill extra holes, use a hacksaw, file real pretty, use Aluminum Black, and make two-pieces! I can usually get two sets from each base.

*- Paul Beckstrom, Columbia Falls, Montana*

## WET-TYPE, FAIL-SAFE SPARK PLUG GROUNDING SYSTEM

My Uncle Dick was one of the calmer ones of the bunch but wasn't as good a mechanic as he thought he was. Drove a Model T Ford for years and I never saw him drive one with the hood on it - he wanted things out in the open where he could get at them in a hurry. He never shut his Model T off when he went anyplace because after he'd worked on one they were darn near impossible to start. (He lived on a hill just so he could get started when he wanted to go someplace.) A Mean Little Kid lived down the road



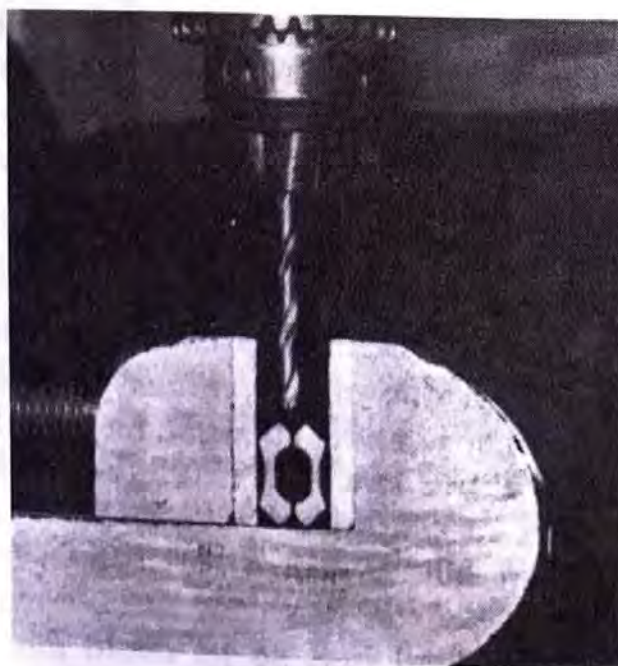
from my folks' place and was always getting me in trouble one way or another. So, one summer afternoon when Uncle Dick came over, I sort of figured I'd try something. After a while I sort of drifted out into the yard and, sure enough, the Mean Little Kid was coming up the driveway. I got him off to one side and explained to him that Uncle Dick's Model T was hard to start, and if someone was to get up on the fender and relieve himself on the spark plugs, it would stop the engine, and it would take all day to get it started and Uncle Dick would be madder than hell.

This was right down the Mean Little Kid's alley, so he plants his bare feet on the fender and cuts loose. Bob, I don't know whether you have ever done anything like this on a spark plug when the engine is running or not, but people who have tell me that it is a unique experience, to say the least. Seems that once you make contact you can't shut down 'till you are plumb emptied out, flushed, wrung dry. Well, the Mean Little Kid had a full bladder and even after he was well dehydrated he was vibrating so bad he couldn't get traction to get off the fender. When he finally did, I would say he made that mile and a quarter home in just under three minutes flat. For some reason it was a long time before he came back.

- Neil Terhune M.D., F.R.S.H., Broadus, Montana

## MAKING WEAVER TOP MOUNTS FIT ANYTHING

I have often thought that the popularity of the Weaver Top Mounts was due in large part to their splendid versatility. These mounts are inexpensive and can be modified to fit about anything





that shoots. For instance, the Winchester 88 bases can be sawed into all sorts of combinations.

When it is desirable to have the ring mounting groove on the top of the base in other than its original position - so you can move the ring forward or backward to perhaps achieve correct eye relief, or to clear a Power Change Ring - its done very easily on the drill press as the picture shows. (It's a devil lots harder to explain it in words, so study the picture hard!) Take a matching base to the one you want to modify, and put them "top-to-top" in the vise on the drill press. Then locate where you want the new ring mounting groove, and drill down between the 2 mounts (with either a #18 or #19 drill) drilling half-a-hole into each mount. The "V" formed by the 2 tops meeting helps center the drill keeping the hole true. Then you can mount the rings properly and never have to worry about them moving on you.

- Dick Mellon, Bentleyville, Pennsylvania

### **WEAVER #53 BASE ADAPTS TO MOST SHOTGUNS**

Around here a lot of areas are only open to shotguns for deer hunting. Modern slug barrels do fine, but restrict the user to iron sights or one of the long eye relief scopes with their attendant small field of view. I have found that the Weaver number 53 one piece base for the Winchester Models 88 and 100 can be easily adapted to most shotguns.

The receivers are usually quite thin on top and the four (4) holes in the base are a real boon. You will have to do a little grinding on the screws and a coat of epoxy between the base and the receiver is not amiss here either, although I didn't seem to have any problems when I did not remember to use the epoxy!

- John Lovallo, Lynchburg, Virginia

### **WEAVER BASES FOR ANSCHUTZ**

Tell the boys that the No. 18 Weaver base for the 43 Winchester rifle fits the Anschutz perfectly.

- Thomas Hughston, Spartanburg, South Carolina

### **WEAVER BASE FOR VENT-RIBBED SHOTGUNS**

Flat sided pump action shotguns with ventilated ribs that extend back on the receiver usually prohibit the use of Weaver's base number 8 which is recommended for this type of shotgun. However, I have found that you can use a No. 3 base, which is designed for the Winchester Model 94, in some instances. You will need to place the top part of the base over the top of the receiver as this



will allow mounting the scope over the rib, or very nearly over the rib, yet still provide plenty of clearance all around.

- *Bryan Burgin, Sidney Center, New York*

### **M-700 SIGHTS ON SLUG GUNS**

I have taken Remington Model 700 sights and milled out the bottom to fit over the rib of a shotgun and then attached in the usual manner. This made a nice applicaton for slug guns.

- *David Weber, Bethalto, Illinois*

### **REMINGTON MODEL 1100 SCOPE BASES**

I use a pair of Weaver number 27 and 22 bases on a Model 1100 slug barrel so that you don't have to drill and tap the receiver. Remove the factory rear sight from the barrel and mount the Weaver bases so that one base is placed on each side of the former sight.

You will need to use an extra long eye relief scope, but then you can take both barrel and scope off the receiver in one piece when they are no longer needed. Best of all, you don't have to drill holes in the receiver which can lower any resale value later on.

- *Thompson Shooting Supply, Fort Wayne, Indiana*

### **WHILE AT THE MATCHES...**

I went to the matches a fortnight ago, and the first day a couple of tykes passed me riding a nondescript hound. The village vicar was wandering around keeping things cool and sober. Seeing the kids, he gave them bloody-you-know-what-for for treating their hound that way. "Why don't you," he asked, "make a harness and get a dog basket (cart) and let your doggie pull you? More Christian, you know!" and shooed the buggers off the range grounds. The last day of the shoot here came the tykes in a dog basket pulled by the hound. Seeing this the Vicar called the boys to him and praised them highly. "And here is a guinea for the two of you. Good lads!" As he hands across the guinea he noticed a string looped under the dog's tail and running back to the driver's other hand. When the import of the string reached him, he turned livid with churchly indignation and ended his on-the-spot sermon with "... take that string off this instant or I'll peel you like a couple of grapes." As the kids drove away I heard one say to the other: "Bloody Damn! There goes our horn and passing gear..."

- *Keith Perks, Kent, England*

### **SCOPE BASES FOR MOSSBERG 40 - 42 - 46**

The rear sight barrel holes are 1½" apart on these guns. By

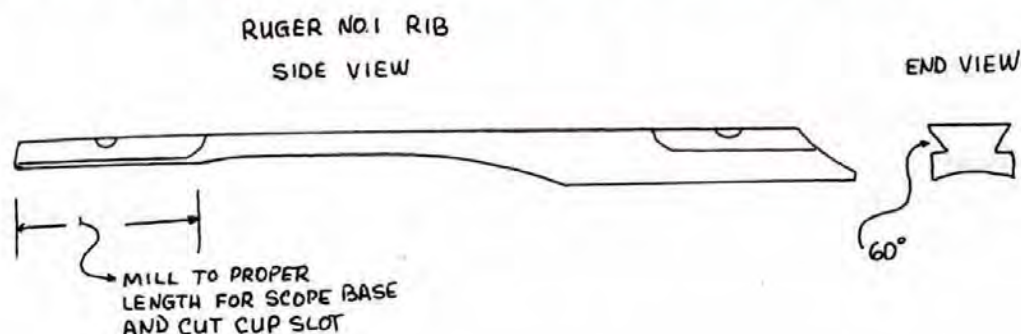


drilling an extra hole in the Brownell Scope Base at this spacing, it is a gas-pipe cinch to mount a V22 on these guns now that the little Mossberg side mount is obsolete.

-Rich Schmidt, Swanton, Nebraska

## RUGER NO. 1 TARGET SCOPE BASE

Had a customer that I built a custom stock for, on a Ruger No. 1B in .243 caliber. He decided that it would be nice if he could

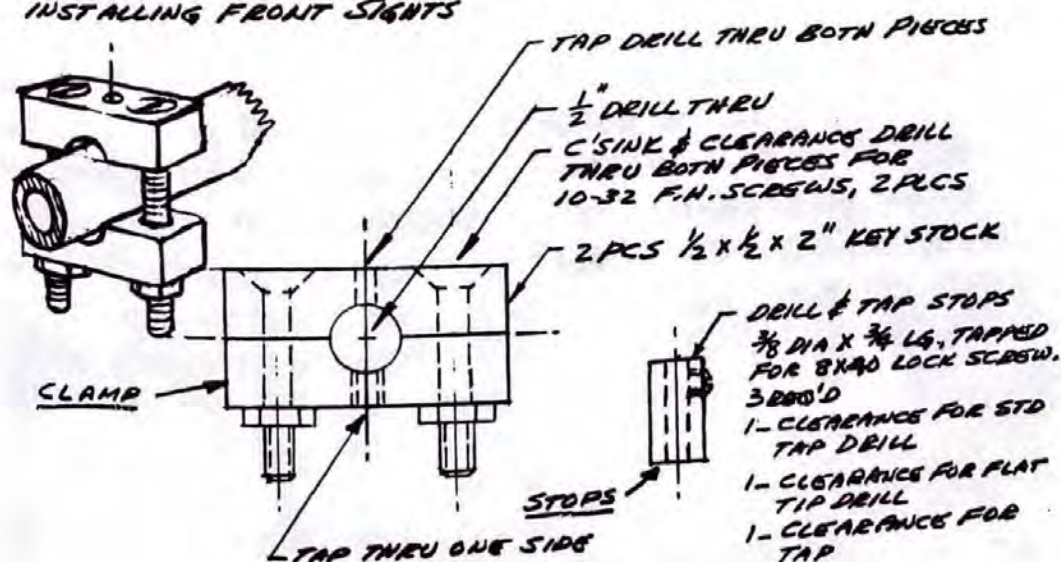


use his 20X target scope on it. This presented a base problem, since this scope takes a shorter base spacing than most target scopes. After doing a little measuring and calculation, the factory 1/4 rib was removed and with my Brownells 60° sight base cutter, milled it per the attached drawing. The eye relief may be a slight bit too far forward, but it worked out real nice.

-John Maxson, Clinton, Missouri

## DRILL FIXTURE SAFELY/EASILY INSTALLS FRONT SIGHTS

The enclosed drawing is of a drill fixture I made up for the 8-40 thread used to mount front sight ramps (Some barrels, like





old. 45-70 Springfields, are thin at the muzzle, and you are lucky to get even one complete thread to hold the sight for sweating.)

The fixture locates the hole top dead center, and (with the drill stops) allows you to drill as close to the bore as you wish without breaking through. The tap guide is a threaded hole, which guarantees that the hole is tapped square, and that the first thread is not reamed out in getting the tap started. The tap stop keeps you from trying to tap deeper than the hole depth.

(One thing not shown in the drawing: after drilling the  $\frac{1}{2}$ " hole between the clamped halves, mike the two halves, choosing the thicker piece to tap as the tap guide. This builds in a bit of a safety factor for the tap stop.)

#### To Use:

1. Slip clamp over end of barrel just enough to allow tap drill to extend over muzzle. Adjust drill stop to bring tap drill as close to bore as you want and lock tight.
2. Remove tap drill with locked stop attached and use it as a gauge to set reground flat-tipped tap drill and lock its stop in place.
3. Use flat-tipped tap drill with stop locked on it as a gauge to set tap stop and lock it in place. Thus, both tap drills and the tap itself all go to the same depth.
4. Open clamp, slide up barrel to desired position (tap drill guide side up) and level crossways. Clamp in place.
5. Run tap drill to its stop, then clean out with flat drill to its stop.
6. Loosen clamp and rotate fixture until tapped hole guide is up. Use shank end of tap drill to feel through tapped hole into drilled hole. Tighten clamp with shank end of tap drill in place in hole. When aligned, the tap drill will turn freely through clamp fixture. Remove drill used as alignment tool.
7. Insert bottoming tap in tapped guide and tap to its stop. The fact that the guide is threaded will prevent "funneling" of the hole, and the loss of the first thread or two. No taper tap is needed; use the bottoming tap only.

- Dan Plamondon, Crescent City, California



## CHAPTER 4

# METAL POLISHING



*"Next time, try a firmer grip!"*

### AIR-TIGHT TUBE FOR POLISH-O-RAY

Use one of those resealable cans with the plastic lid that Pringles Potato Chips come packed in. They are air tight, keeps the polish from drying out and makes it easy to store. (Note by Bob B. - this may be the all-time single most mentioned Kink we have ever received. Nice that all those great minds think alike...)

*- A Whole Gang Of You*

### STYROFOAM CUP CAP

I put one of those throw-away styrofoam drinking cups over



the end of the tube of Polish-O-Ray before sliding into the plastic bag that comes with the tube. Further protects the compound from drying out, and seems to keep it moist almost indefinitely.

- Marvin Kahl, Sr., Baton Rouge, Louisiana

## BREAKING IN A NEW POLISHING WHEEL

I was having a heckofa time getting polish to stay on a new wheel until I hit on the following procedure. First, dice up enough Polish-O-Ray to fill a baby food jar, add a little water and warm gently until the goop turns into hot lava. Now, smear it on the periphery of the wheel until a good visible layer of polish is built up. Don't get excited when the wheel dries; it'll look like glazed concrete! Maul the wheel with a plastic mallet and it will take recharging like a duck to water.

- Pete Lautrec, Menomonie, Wisconsin

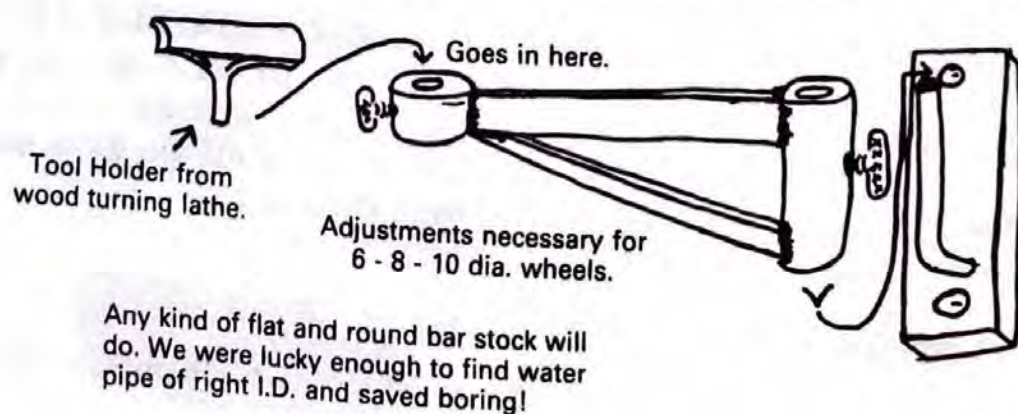
## MAKING POLISH STICK

Getting polish to stick to an old wheel can sometimes be a tough job. I take the wheel off and turn it around and touch it up; it seems to get the fibers realigned. Then I take the wheel off and reset in the original direction. Now I can apply the polish in my usual manner. It works like a charm.

- Tom Moyer, Mountain Home, Idaho

## TRUING NEW FELT POLISHING WHEELS

If your new felt wheels are not trued and your polishing lathe (outfit) absolutely vibration and bounce free, it is absolutely impossible to turn out first class work. Ripples are going to form on the surface of the parts you are polishing come hell or high water or both. We found in our own shop years ago that the best way to true new felts (cloth wheels, too) was to make a "tool rest" to fasten on to each of the polishing pedestals. Use the end of a file or rasp as your "truing tool" to get the wheel running perfectly true on your motor shaft. When you think you have it true, hold a soft





lead pencil on the tool rest and just lightly touch the surface of the spinning felt. Remove pencil and turn off motor. When the pencil line goes all the way around the wheel without gaps, the wheel is true. (Note, the wheels as they come from the manufacturer are never exactly true to center, but just like finest tires you can buy, they must be balanced.) You cannot do this initial job "free hand" no how with a truing brick. The truing brick should be used later to remove old polish from the wheel surface and for roughly truing up. For final true, use the holder.

The drawing is mighty rough but it will give you an idea. Most of you fellows are so ingenious that you will look at my sketch and take off running and come up with something better for your own particular needs.

- Bob B.

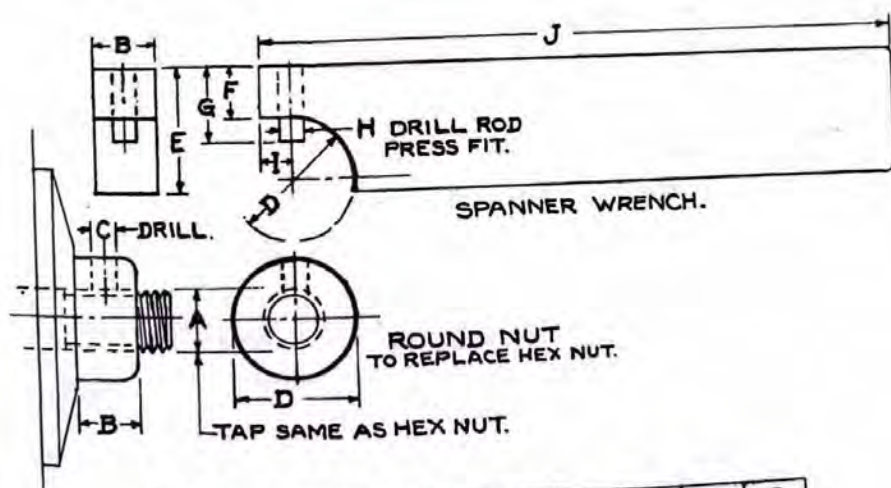
### POLISHING WHEEL NUT

Make a really oversized one out of  $1\frac{1}{2}$  inch round stock x  $\frac{3}{4}$  inch thick. It's big enough that you can take it on and off with only finger pressure; makes for really quick changing of your polishing wheels.

- Dave Christen, Wadena, Iowa

### ROUND NUT AND SPANNER WRENCH FOR BUFFERS

Why put a dent or ding in a barrel if you slip off the wheel while polishing and hit the hex nut? I used my lathe and made



A	B	C	D	E	F	G	H	I	J
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{13}{64}$	1	1	$\frac{5}{16}$	$\frac{3}{16}$	$\frac{1}{16}$	$\frac{1}{4}$	6
$\frac{3}{8}$	$\frac{5}{8}$	$\frac{17}{64}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{5}{16}$	$7\frac{1}{2}$
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{21}{64}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	9
$\frac{3}{4}$	$\frac{3}{4}$	$\frac{25}{64}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$10\frac{1}{2}$
1	1	$\frac{29}{64}$	1	2	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	12



some new round nuts to fit on the end of my buffer so this wouldn't happen to me. I also made the spanner wrench needed to go with the nuts, and the drawing fully explains both items.

*-Jack Thompson, Birmingham, Alabama*

## ALASKAN SNOW PROBLEMS

My son, who lives in Alaska, says the first thing Eskimo children are taught is 'Don't eat yellow snow'.

*-Tom Butler, Denver, Colorado*

## POLISH CATCHER

To keep polish from flying all over the shop when loading the polishing wheels, make a box with sides, bottom, back and top-but no front - just big enough to go behind one polishing wheel. For even closer fit, make a half-moon cut on each side panel to line up with the shaft. Then, when you are loading each wheel, put the "catcher" behind the wheel. Really keeps down the mess!

*-B.W. Birdsong, Mableton, Georgia*

## CATCHIN' CAN

For a pedestal mounted buffer, one of those plastic kitchen-sized trash cans placed under each wheel will catch about 99% of the small parts grabbed out of your hands by the wheel. This has saved me much cussin' 'n fummin'. Besides, it also reduces polish throw over the rest of the shop by about 80%, too. Just hang the can sorta up and behind the wheel, out of your way, but close enough to catch what gets away from you.

*-Charles Poff, Jr., Corinth, Mississippi*

## SUPER-DUPER FAST BARREL POLISHING

This is a real doozie for taking krud and stuff off barrels FAST. What you do is this: get one of the 3" diameter wheels from the "Three-In-One" sanding drum kits in the catalog. Mount this in a hand drill. Now, take a sanding belt and turn it inside out with the grit inside. Slip the sanding belt over the barrel and insert the mandrel inside the belt and exert a bit of pressure, drawing the belt tight. Turn on the drill and be ready for action! It takes a bit of practice to keep the belt from flying off the mandrel - but with time you will learn not only to keep the belt running full tilt but by changing the angle of the electric drill a bit, make the belt move full length of the barrel and back - removing things quickly. I'd suggest you do the final polishing in the usual manner with polish and wheels.

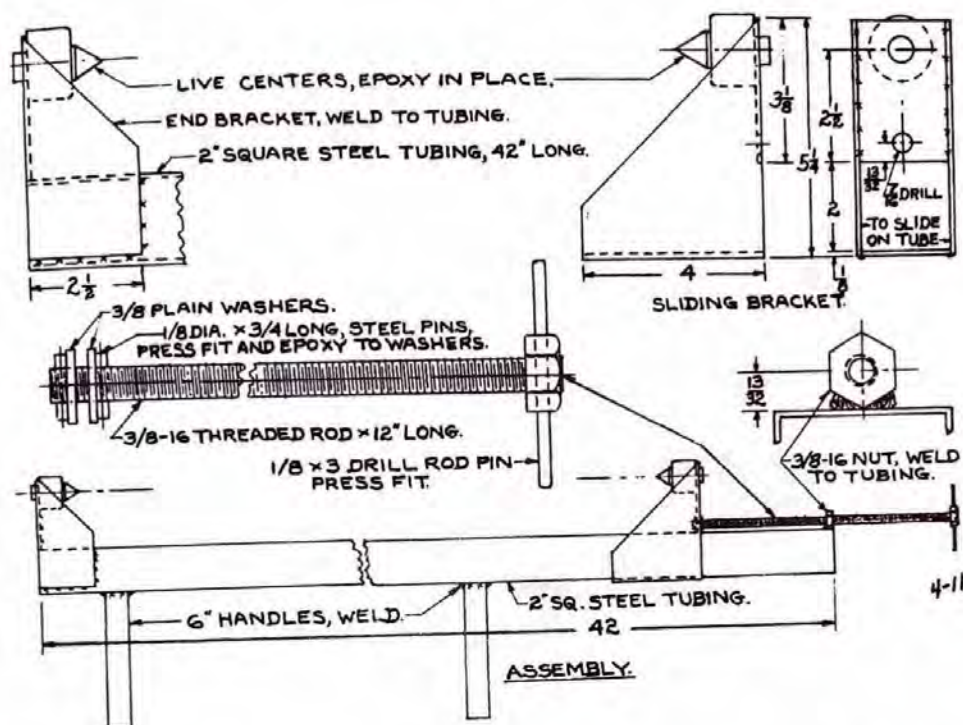
*-Raymond Burgett, St. Charles, Missouri*



## CUSTOM DESIGNED BARREL SPINNER

Here is a drawing of my barrel spinner and I hope others will find it as useful as I do.

To use: Install barrel, or barreled action, between live centers and follow regular angled buffing instructions. I've found that



buffing gives sufficient barrel rotation, which is then controlled by varying wheel pressure, buffing angle, and resistant finger pressure. The only time I use purely longitudinal passes is with a loose pad and 555 polish as the next to last pass. Holding it nearly horizontal and moving slowly with 400 grit polish will result in a factory like uniformity. With the fixture, you do not handle the barrel either.

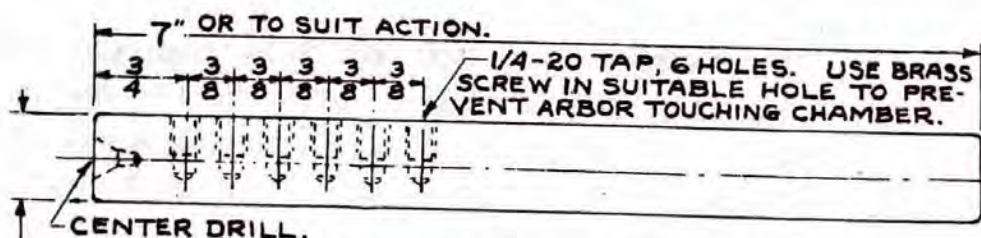
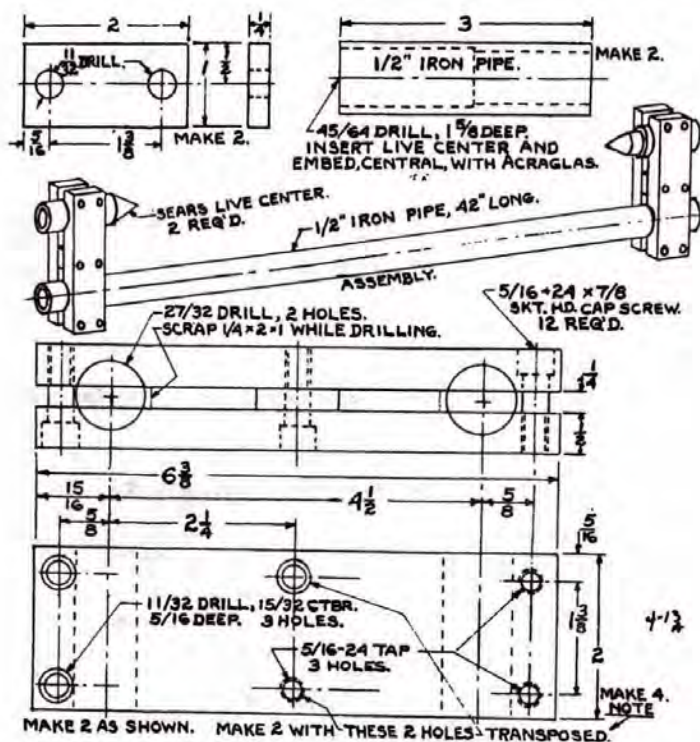
-John Belveals, Sumter, South Carolina

## BARREL POLISHER

The drawings are of the barrel polisher I made up for use with a belt polisher. Parts used were a piece of steel tubing 42" long; four pieces of scrap aluminum  $\frac{1}{2}$ " thick by  $6\frac{3}{8}$ "; two pieces of aluminum  $\frac{1}{4}$ " thick by 1" by 2"; two live centers from Sears which sell for around \$10; and some miscellaneous screws. The aluminum blocks are assembled as shown for a sliding fit on the pipe or tubing. You can then slide the block along the pipe to wherever needed and tighten the two cap screws down to clamp it in position. The two live centers are secured in the 3" iron pipe and mounted in the blocks. A barrel mounted between centers really rides along



very freely. You can also mount barreled actions on the fixture with an adaptor which consists of a steel rod to replace the bolt with a center drilled in the end. Use a brass stud to screw into the cylinder for a stop to prevent the other end from touching the end of the barrel.



DIAMETER SAME AS OF BOLT IT REPLACES.

### ADAPTOR FOR BARRELLED ACTIONS.

To use the barrel polisher, I mount my 2½" x 48" belt sander in the horizontal position on a bench, with the belt overhanging the edge of the bench for full clearance. I remove the planten assembly from the grinder and utilize the slack of the belt between the pulley and rubber contact wheel. With a barrel free and clear of obstructions (such as ramps and sights) suspended between centers, you can just spin out and polish it on various grit belts in no time flat.

Wear cotton gloves on your hands and grasp the tube with one hand on one end of the fixture, letting the tube rest on the upper portion of your wrist or arm. By holding the unit at about 45° to the belt, you can get about 3" to 4" of coverage with the 2½" belt



on your barrel. Bring one end of the barrel into contact with the belt and carefully spin it across. Break the barrel with the gloved hand that is on it. Do not let it spin free, as it will really rev up and you need only about 30 to 60 rpm or so on the barrel. Make it a smooth and constant rotation.

(A word of caution: I find that the edges of the belt will really dig in and the coarser the grit, the worse the problem. By simply applying 555 Polish to the belt edges and loading them up, the problem is greatly reduced.)

With a real rough cob of a barrel, it may be necessary to start out with about an 80 grit belt and work up to a 120 or 150, then a 240 and finally a 320. When going to the next finer grit, rotate your barrel 90° (or 45° with the belt) to the opposite side. This makes it very easy to see if you have the previous grit marks removed. Alternate this movement with each grit and when finished with the 320 grit belt, remove it and replace it with a worn out and loaded up 320. Now bring the barrel straight across or at 90° with the belt, tilting the unit slightly so that the leading edge of the belt bears a little hard and the trailing edge does not bear too much. Sometimes belt slap from the trailing edge appears to leave a mark.

I have found this method to give a real nice polish very fast and for a real nice looking satin finish, stop at 320 grit. In fact, this may be one step too far as the worn out, loaded up 320 belt really puts a shine on. You may want to do some experimenting and wish to stop at a fresh 320 belt.

On barrels with obstructions, that's a little different story. You may have to work out your own techniques on these. However, I find myself slowly polishing the hard to get at spots first by holding and rotating the barrel in my hands getting what I can on the slack of the belts. Do not use a coarse grit when rotating by hand as it is too easy to get carried away. You may even use your felt wheels in these places. Then insert the barrel into the fixture and spin out what sections you can.

After removing the barrel from the fixture, I finish up the barrel by hand with silicone carbide wet or dry paper (wet with kerosene) to get the marks running all the same direction where applicable and to get an even texture. This makes for a nicer looking satin blue job.

I use my hard platen very little; just once in a while with a coarse belt for some really rough work. The biggest problem I find is that the seam of the belt thumps me and the work every time it comes around which makes for higher belt casualties. However, the rubber contact wheel is really great. The one on my unit has a fair-



ly thick layer of medium soft rubber and works very well in absorbing the thump of the seam. For doing work on the flats, it seems I can obtain a better looking finish faster on this wheel by polishing 90° out of phase on successive grits. Once you get the hang of making a smooth motion with even pressure on each pass, I think you will like it also.

This contact wheel also works great on octagon barrels. Work these against the wheel making smooth 45° passes, and alternate the 45° from side to side on successive grits. I have found that a 220 grit is coarse enough initially, except if you are working on a severely pitted barrel. You are working on such a small area of the flat that anything coarser can get away from you and dish out spots on the barrel. On the last pass, use a worn 320 belt and go straight down, not angling the barrel at all. Again, once you get the knack of working octagon barrels, you will find that the rubber contact wheel really works great.

This technique also works equally well on small parts and flat sides of receivers. On receivers, finish up all your different radii first, then do the flats. This helps in bringing back the sharp edges. For example, on the current Remington line, do the flats last alternating 45°'s each grit. However, the old Winchester Model 94's, Model 12's, etc., present somewhat of a problem with their radii at the end of the flats. On badly pitted ones, you can do about ⅔ of the flats before you run into the radii by using the coarser grits in the method described above. From then on, I draw file the area around the radii and try to bring them down to the center portion of the flat which I grind on the belt. On these problem areas, I then switch back to the belt. By taking a worn 220 grit belt, or a fresh 320 grit belt, and changing the tracking of the belt so that it tracks about ⅛" or so overhanging the outside edge of the wheel, I go at it very carefully working across the short width of the receiver. It helps to have the edge of the belt loaded as mentioned earlier. Do this patiently and evenly, trying to maintain the flat. Bear down harder in your problem areas next to the radii, working the radii right up to the wheel. The unsupported, loaded edge of the belt whipping around in the radius seems to polish some of it without much distortion. Be careful, it is too easy to get carried away with coarse grits. Touch up the radii with a lapping rod and silicon carbide wet or dry (again wet with kerosene) in your ¼" electric drill. Finish off the flat and radii with a flat rubber sanding block and wet or dry (wet again) working the full length longitudinally into the radii. Blend it all in and get an even texture on the surface and by all means polish all the radii and other surfaces before tackling the flats on the receiver.



Narrow strips of the finer grits are ideal for polishing the insides of double barrel trigger guards, hammer spurs, etc., working off the slack of the belt. If you start tearing up a belt while using the platen, salvage what you can of it into narrow strips. You will be surprised how handy they become, and you can sometime make them conform to some weird and small radii.

- Wesley A. Peterson, Charlottesville, Virginia

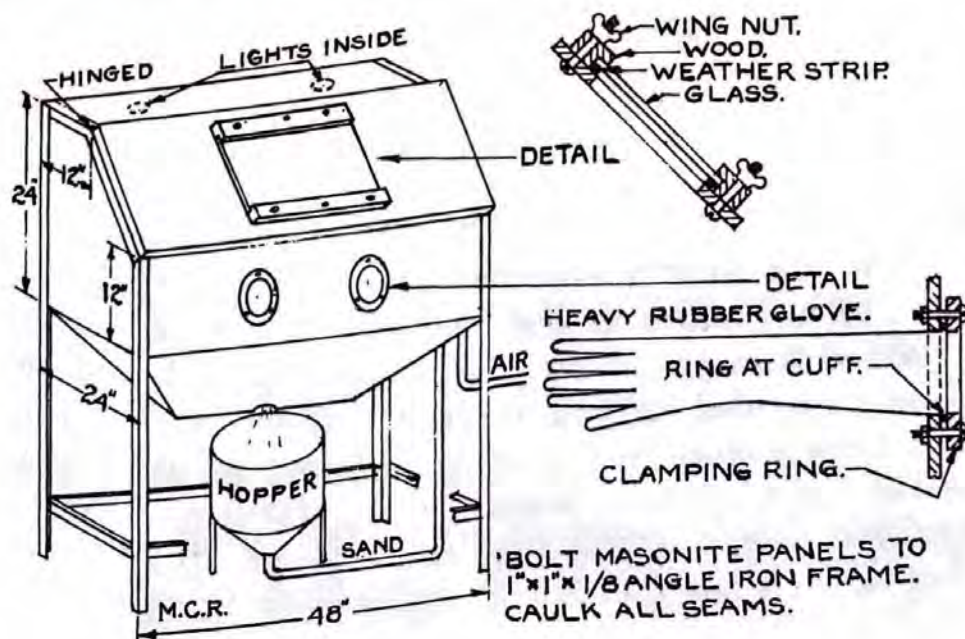
## POLISHING OCTAGON BARRELS

There seems to be no end of octagon barrelled .22 caliber pump rifles - some in really bad shape. Trying to keep the flats flat and the edges crisp had been driving me nuts until I came up with the following. First take the disc sander and be sure that the face is square with the table. Next, take the barrel out of the receiver, if possible. Place it on the sander table with one of the flats parallel to the table so the other will be squarely against the sanding disc. By being careful to keep the flats flat against the bearing surfaces, you can smooth out these barrels real nice. You can vary the pressure and speed with which you pass the barrel over the disc to fit the condition of the barrel and control how much metal you are taking off to smooth it out. Of course, have to be careful not to polish off the markings!

Finish off with a felt polishing wheel, keeping the barrel perpendicular to take out the disc sanding marks. Finally, polish lightly on a loose muslin wheel. With care you can turn out a real nice job and cut polishing time on these barrels in half.

- Harry Neuhaus, Fort Wayne, Indiana

## SAND BLASTING CABINET





I think probably one of the most useful tools in a gun shop is a sand blasting cabinet. I started with a portable sand blast unit from Montgomery Wards and built a cabinet around it. The size of the cabinet was dictated by the space available in the shop. Others may want it larger. However, the largest expense will, of course, be the compressor. The bigger the better, but, like me, most will be limited by the bankroll.

*-Jim Thompson, Topeka, Kansas*

## **PERFECT SCREW-HEAD POLISHING**

I swear this is the best way to do screw heads without rounding the slot, and results in a beautiful concentric finish even nicer than a brand new factory screw. Clamp a piece of the finest grain softest pine board onto the drill press table. (Should be about 3-4" square and smooth and flat.) Then put the threaded shank of the screw in the drill press chuck with the underside of the screwhead touching the jaws for support. Tighten gently - might even want to put a layer of cellophane tape around the threads to protect them, though usually not required. With the drill press still off, gently "bump" the screwhead into the wood several times. Then turn the chuck 90 degrees by hand and do a couple more times resulting in a form-fitting shallow depression in the wood. Put a piece of 400 grit silicone carbide wet/dry paper over the depression and a drop of oil on the paper under the screwhead. Turn on the power to a slow setting, and press the screwhead lightly into the paper. Lift the spindle, shift the paper to a fresh area, oil, and repeat. Do several times and then change to 600 grit paper, and you'll have the most beautiful luster finish on your screwheads imaginable. Just be sure to use the very thin, dark gray kind of paper... not the heavy crocus cloth type, and you'll have no more smeared slots or flattened heads. AND, the screws never fly out of your hand to get lost in the shop like they do on a buffing wheel.

*- Sam Boses, Yonkers, New York*

## **HIGHER SPEED FIRING PIN WANTED**

I am enclosing what I consider to be the 'classic' warranty complaint of all my years in the business. All my gunsmith customers I showed it to got as big a kick out of it as I, and thought it should be forwarded to you for the rest of the fraternity: A claim check from a store in the area made out as usual and then under "Article: Win. 30-06 - Model 70A... Nature of defect: Firing pin does not seem to strike shell firm enough. Bullet trajectory fell short of target when test firing. Bullet velocity was very, very slow..."

*- Walter Lodewick, Portland, Oregon*



## RUB OUT RUST

To remove a spot of rust from a barrel or receiver, take a round polished steel rod (I use a screwdriver shank) and rub the spot with some pressure, wipe off and rub again until all rust is gone. The finish around the spot will not be damaged and can really save lots of work in the shop.

- *D.L. Buchanan, Port Lavaca, Texas*

## USE YOUR HAND DRILL...

I use a mandrel like shown on pages 202 and 203 of **Gunsmith Kinks I** for polishing trigger guards, etc, but, I mount it in a  $\frac{1}{4}$ " electric drill that is held in a bench vise. The bearings of a drill press are designed for downward thrust **not sideways** and you can put unnecessary strain on it using it sideways. Most shops only have one drill press and it is suppose to do an accurate job drilling mount holes, so keep it for that. (Besides, replacing a worn drill press quill is hard work, expensive, and worst of all, time consuming.) A second  $\frac{1}{4}$ " drill is a lot cheaper than a second drill press.

- *Gary Thiry, Sacramento, California*

## CYLINDER POLISHING MANDREL

I use the shank end of a close-fitting fractional drill for a pivot for revolver cylinders while buffing them, (if I can't find the proper size rod). You can use the same theory for magazine tubes too, except use a wooden dowel, if available, and they will come out good!

- *Tom Butler, Denver, Colorado*

## WIRE WHEEL CURES POLISHING PROBLEM

I ran across a Remington Model 31 the other day that 140-grit polish on my buffing wheel wouldn't even scratch the old blue. I finally put on a wire wheel that did the job nicely and left a sand-blasted effect. I was then able to complete buffing in the conventional manner. I also tried it on a Mauser 98 action and then reblued it as is and had a satisfied customer.

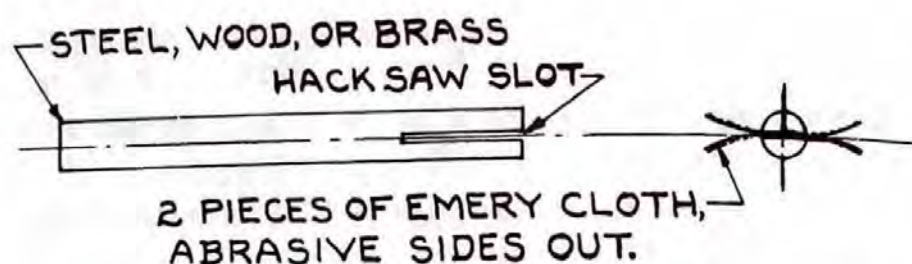
Those who have been in the business longer than I have may already use this method from time to time, but if not, it might prevent gray hair for someone else that runs up against the same problem.

- *Jim Preston, Westminster, Colorado*

## DOUBLE-FLAP FLAP WHEELS

I'm sure that most every gunsmith knows about slitting a piece round rod and placing emery paper in the slot for polishing; but some may not know that by using shorter pieces of emery and





FLAP WHEEL TYPE, SAND-O-FLEX POLISHER.

using two pieces with the non-abrasive backs together makes a nice little flap wheel polisher.

- W.A. Young, King of Prussia, Pennsylvania

### ROUGH POLISHING TIP

For rough polishing of bolt bodies, handles, pitted barrels, and receivers, I use an abrasive flap wheel in about 80 grit. These are great for quick cutting.

- Terry Werth, Lincoln, Illinois

### DRAW FILING AND NO. 2

Your Rust Preventive No. 2 is just fine for draw filing. I can't explain it, but it helps keep the file clean and also aids in cutting. However, towards the finish cuts you do not want to use much as it helps the file cut too fast!

I discovered this kink quite by accident. . . I was trying to salvage a badly pitted old rifle that I soaked in this "No. 2" and noticed how fast the draw filing went.

- Bob LeSuer, San Pedro, California

### LOGIC AND MEDICINE

Sam was up in his 80's and had never had much use for "modern" medicine. One day down at the cafe we were solving the problems of the world over a cup of coffee and the subject of the young doctor that had just moved to town came up.

Sam responded that quite frankly, he didn't think the boy was worth a darn. When asked why, he told of seeing the young doctor only the day before about a pain in his right arm. The doctor, after a lengthy examination, told him that it was simply "old age"!

Sam looked me straight in the eye and said: "Hell, Bob, that can't be right! My other arm is just as old and it don't hurt a bit!"

- Bob B.

### CLEANING NUMBERS OFF A MILITARY FLOORPLATE

When rebuilding and sportizing military actions, I like to get rid of the serial numbers stamped on the floor plate, since it looks



pretty crumbly to have the gun all gussied up and still have their numbers showing.

To take them off the easy way, just turn the floor plate over and mark on the back side the location of the numbers you want to remove. Take a small pin punch, about a  $\frac{3}{32}$ " or so will do nicely, and round off the end of the punch so the sharp shoulders are removed. Put the floor plate face down on a lead bench block (a chunk of plumbers lead, about 5 lbs and usually round) and from the back punch the numbers flush with the face of the floor plate. Turn the plate over, and strike off the raised metal with a file. If the numbers have not completely disappeared yet, repeat the punching on the back, and strike off again with a file. Removes them completely and neatly - and very, very easily!

- Ed Moore, Greenville, North Carolina

## BOLT JEWELING WITH STP

I've been having all sorts of problems with various engine turning systems and finally ordered some of your little round wire brushes... but the oil/abrasive mix just didn't seem to stick to the work area too well. So, I mixed up the next batch using STP. That stuff works wonders. Mix up a paste of that with your abrasive and it will really stay put. No kidding, your brush did a wonderful job - and about 97% of the STP/abrasive paste stayed put on the bolt with hardly any mess to speak of.

- Wesley Peterson, Esmont, Virginia

## JEWELING

Here is a kink that I haven't seen previously. When jewelers awkward, curved surfaces which cannot be held in a drill press vise, I put a medium sandbag under the piece. Saves much frustration. Just make sure that the sandbag is not packed either too tight or too loose.

- James Somerville, Salem, Illinois

## "DULL" ENGINE TURNING

I've a kink that I have been using on hard-to-please customers who like engine turning on their bolts but feel that the "bright" shine will scare away game under certain conditions. After I have polished all parts prior to bluing, I also polish the bolt, being careful not to touch the locking lug surfaces. I then jewel the bolt. This provides a very shiny, jewelled surface - right? Now chuck the bolt into your bluing tank along with the rest of the gun parts. When you're done bluing, carefully buff the bolt on your buffing wheel and you have a beautifully jewelled but not excessively



bright bolt. I personally like this finish better than the conventional 'silver' looking jeweled bolt. I am sure that after some of the other boys try it they will agree with me. (From BB: sounds like a good idea - would further suggest that when jewelling that you make the turning marks a bit deeper than otherwise to prevent their being buffed off later. . .)

- *R.K. Hibma, FPO San Francisco, California*

## IMPROVED ENGINE-TURNING TECHNIQUE

I just discovered a way to eliminate those occasional 'flier' wires that stick out further than the rest when using your engine turning brushes! All you need do is to slip a section of surgeon's tubing over the full length of the exposed shaft (not within the chuck jaws) and all the way to the end of the bristles. Surgeon's tubing is outstanding for this because it's flexible enough to expand with increased pressure (which causes the bristles to flare out) and yet it immediately retracts the bristles when pressure is removed. This combination, when used with abrasive, gives an absolutely superior result. All edges are sharp, the pattern of each swirl is uniform in texture clear across and finally, brush life is greatly increased.

- *John Belreal, Sumter, South Carolina*

## JEWELING JUICE

Your Flute Juice mixed up with some of your 120 grit abrasive powder into paste form and used for jewelng on rifle bolts, etc., sure does a nice job. I've also settled on the little stiff wire brush as the best for all jewelng operations.

- *M/Sgt. W. C. Morrow, APO, New York*

## JEWELING PASTE

For jewelng bolts, I use Permatex valve grinding paste (water base) which comes in small tubes, and one of your engine turning brushes. It does a very nice job, is convenient, and easily stored.

- *Joe Fogal, Chambersburg, Pennsylvania*

## GETTING YOUR DOLLAR'S WORTH

Two little kids were playing in the vacant lot next to a house of ill repute. Guys were coming to the door & knocking. A woman would answer and ask, "Yes, what do you want?" The guys would say, "I've got \$2.00" and she would say, "Come in." Well, this went on for a while and one kid says to the other kid, "How much money you got?" - "25¢. How much you got?" "25¢ - Hey, you want to try?" "Sure!" So up they go and knock. Woman says,

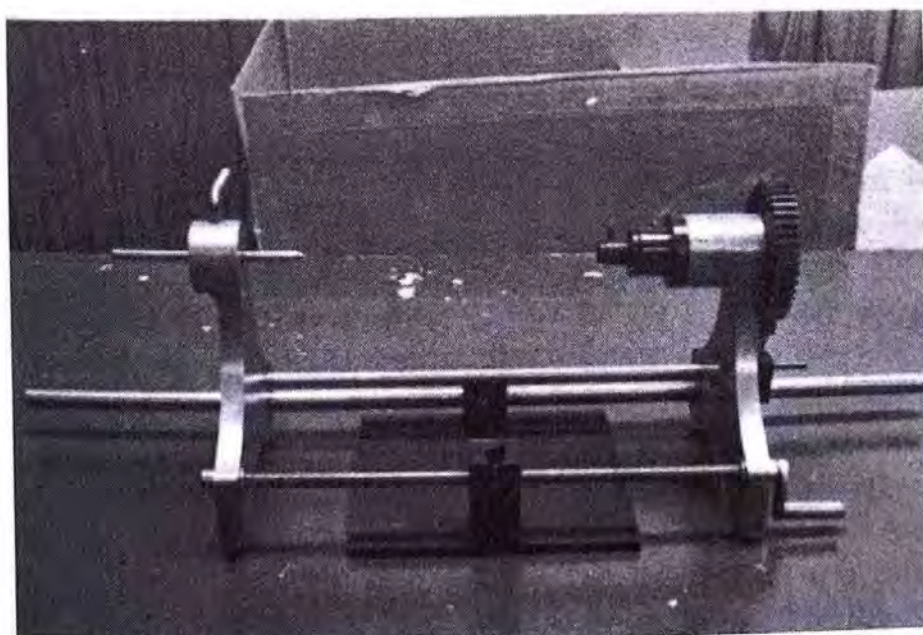


"Yes, what do you want?" One says, "I've got 25¢ and so's my buddy." "Well, come on in," she says, and knocks their heads together & dusts their drawers & boots them out the back door. One gets up & dusts himself off & says: "WHEW! I don't think I coulda stood the \$2.00 worth!"

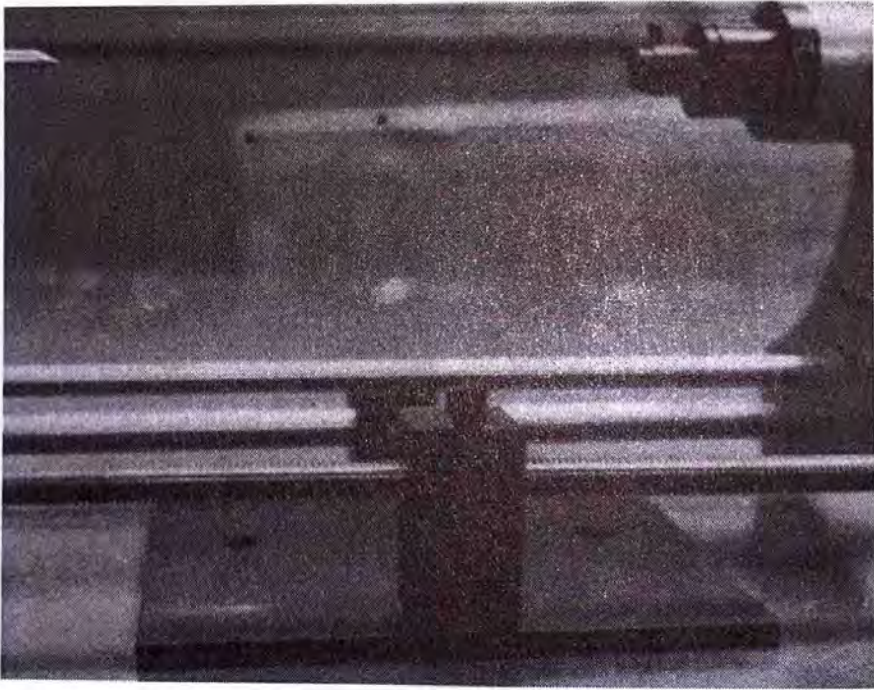
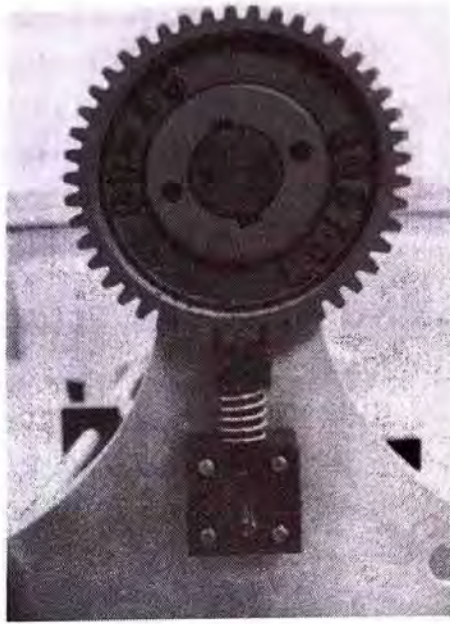
- Mel Staheli, Quesnel, British Columbia, Canada

### A PRECISION INDEXING BOLT JEWELING JIG

The pictures included here are of the new bolt jewelry jig I designed and made to give me absolute indexing around the bolt as well as down it. Of course, there are a few things that are not really necessary - from a functional standpoint, such as the bronze







bearings, stainless steel shafting and annodizing; but they do make for nice touches. There is one feature, however, that is very important and worthwhile - the lock feature on the indexing block. This keeps the Jig from "picking up" when the crank handle is turned. (Note from Bob B. - We're really indebted to Bob for sending along this fine Kink - and the superb blueprints that he did for the benefit of the rest of the gunsmithing fraternity. If you would like a complete set of the prints, send along your address and \$2.00, to cover copying and mailing costs, with your request for the "Bolt Jeweling Blueprints" to Brownells, Inc., and we'll gladly forward to you. This is a beautiful jig, able to give you control over a jeweling job like you've never had or thought possible!)

*- Robert P. Lloyd, Chapel Hill, North Carolina*



## STAINLESS STEEL PISTOL POLISH

It may interest the rest of the fraternity to know that you can put a beautiful polish on any of the new stainless steel handguns with little effort, a soft cloth and Simichrome. No electric buffer is needed. It only takes a few minutes and even removes the powder burn from the front of cylinders . . . will also polish watches, crystal and all, to a brand new appearance in just a few minutes. Brass parts on replica firearms look like gold.

*- Tom Wheeler, Albany, Georgia*

## SHARPENING KNIVES WITH SIMICHROME

Simichrome polish on a revolving felt wheel puts an unbelievable keen edge on knife blades. I keep a felt wheel and Simichrome to use for nothing but knife sharpening - saves a lot of time and works amazingly fast.

*- James Somerville, Salem, Illinois*

## AND JUST TO FEEL GOOD

A. J. Foyt, Jr., the famous race car driver, was having a problem polishing up the aluminum headers and oil coolers on his #14 car that holds the world's closed course record of better than 227 mph. The car is going to Italy to go on exhibit alongside the products of famous European manufacturers . . . The #400 grit Polish-O-Ray and #555 which I took them, polished out gravel pits and nicks and the car passed Mr. Foyt's critical inspection, all very happy - compared the finish to a brand new shiny dime - the car, tho' is valued between 100 and 110 thousand dollars.

*- Chet Hermansoder, Houston, Texas*



## CHAPTER 5

## BLUING, BROWNING &amp; PLATING



***"No thanks – I'm gonna blue it myself!"***



## BLACKENING ALUMINUM SCREWS

Re the difficulty of bluing aluminum screws, etc. - I have found that if you will copper plate the screws, heat the plated screw in propane flame, the copper oxidizes to black copper oxide. Simple to do, too. Suspend screw in copper sulphate and hang to "-" negative side of 6 volt battery. Also put a piece of copper in the solution, connected to the "+" plus side of the battery. Plates quickly. The finish is pleasing which satisfies my customers.

- Larry Dillon, Spurwood, British Columbia, Canada

## BLACK COLOR ALUMINUM TOUCH-UP

I use a "permanent" felt tip pen for touch-up on anodized aluminum. It will not wash off, does a fairly nice job, and gets you out of a bad situation.

- Terry Werth, Lincoln, Illinois

## COLD STEEL AND IM

After experimenting with cold blues for several years, I have finally found a method that does the job. I have found that if I first cool the parts to about 50° (or less) and then immerse them in the IM for a few seconds, I get a very smooth, clean blue. Next, set the part aside 'til it dries, polish it with a fine soft cloth with some light-weight pure Mineral Oil, and I get a beautifully black part (especially on cast parts).

- Larry Mitchell, Perryville, Arkansas

## "TP" YOUR IM

My method beats your directions for IM. Try it and I am sure you will agree. Again, no tanks or heat necessary. Buff work as usual. I use #140 and #400, then etch slightly, rinse, card with a fine wire wheel (the wire wheel is strictly for texture - not necessary) then clean with acetone if the wire wheel was used (to remove oil traces), otherwise not necessary. Apply IM to the work with a piece of #00 steel wool. The steel wool keeps the color even - if a swab is used, it will take darker in some spots than others. After lightly rubbing the dripping solution (I work on top of a clean newspaper) for 2-3 minutes, wipe off work with a clean rag (I use toilet paper - cleaner, cheaper, absorbent). Apply another coat using same procedure as the first. Three coats, taking a total time of about 10 minutes, were all I found necessary. The finish was every bit as good and much easier to apply than fooling around with the tanks.

- Zoeth Skinner, Gladstone, Oregon



## REMOVING BRASS HAMMER MARKS WITH OXPHO-BLUE

Have you ever found yourself in a situation where you'd driven a nicely blued part in or out of a gun only to discover that you'd left brass markings on the part? Sure can be discouraging! Discovered that it is quite simple to cure: Use Oxpho-Blue. A small bit on a patch, wiped lightly will do the trick and not damage the other blue.

- *Brian Boshnack, Coral Gables, Florida*

## OXPHO-BLUE SPRAY

For applying Oxpho-Blue to large or irregular surfaces, slots, holes, etc., I use a device sold as "Spray Pal" - a plastic spray head attached to a plastic bottle. I prefer the pint size, one-piece assembly. As compared to a swab, it will apply a nice, even coating of solution to any shaped piece quicker and with no waste. And, there is no chance of fouling the clean solution by accident. (Be careful not to spray too heavy a coat and cause runs - BB.)

- *John Hall, St. Petersburg, Florida*

## ON THE WAY TO THE FIRE

An oil well fire broke out and in a short time was burning furiously. The owner of the oil field called in professional oil well firefighters. They arrived on the scene with their sophisticated equipment, but could get no closer than 1000 feet to the blaze because of the intense heat. They parked their vehicles at this point and told the owner of the well they would have to wait for the fire to die down or burn out. In despair, the owner called the local volunteer fire department. Fifteen minutes later an old fire truck comes bumping down the road. The truck draws closer and drives right past the professional oil well fire fighters, the men in the truck screaming from the heat as they go by. The truck pulls up 50 feet from the fire. The men, still screaming, douse themselves with water, and put out the fire. The owner of the well is so happy he runs up to congratulate the men. "I am so grateful to you and your men," he says to the chief, "that I am giving you \$2,000. What are you going to do with all that money?" The chief, without a moments hesitation says, "The first thing we're going to do is fix the brakes on that @\$%&! fire truck."

- *Bob Bower, Horsham, Pennsylvania*

## BLUING SOFT-SOLDERED RIBS WITH OXPHO-BLUE

Have had the best luck on soft soldered barrels as follows - and note, no tanks or heat. First repair barrels, soldering any loose sections of joining ribs. Next, scrub them down with #80 emery cloth



around a file. Buff with #140 and #400. Sand blast with old, worn sand. Card down with fine wire wheel (all this is for texture which will look great - like a cold blue, slow rust job. Metal may be thoroughly buffed using any method, so long as it is buffed). Clean with acetone, saturating the rag and really slopping it on the work, using normal precautions. Allow to dry and lay barrels on clean newspaper... Now, saturate a rag, folded into a small pad, with Oxpho-Blue. Keep plenty of solution on the pad and work fast, slopping and rubbing in long strokes. Allow to dry in a vertical position. (Sometimes I let this first coat dry over night.) You will note that regardless of how fast you work, some spots will appear darker. Saturate a small piece of #00 or finer steel wool with Oxpho and rub longitudinally and vigorously but LIGHTLY. Allow this solution to dry on the work and repeat until satisfied with uniformity of color, at which time allow last coat to dry and then rub off lightly with clean, dry steel wool. Oil and you're in business! I get about two sets of barrels to a bottle of Oxpho Blue. Above requires no special equipment, just care. The Oxpho will not take evenly on a dirty surface.

- Zoeth Skinner, Gladstone, Oregon

### **OXPHO-BLUE - THE JUNKER SAVER**

Best danged cold blue I've ever found. I had a fisherman friend who brought in his boat gun because the rust was really building up. The gun was a \$40 four-ten, and the kind you can't really let in the front door. I told him that the cheapest thing he could do was to drop the gun overboard and invest in another one just like it. But he figured my time was less than the cost of a new one, so he left it.

I brightened it up a bit with the wheel and put on 3 coats of Oxpho-Blue and he was as happy as could be. That stuff really works, and in 30 minutes I earned half a halibut.

- Ronald Prichard, Ketchikan, Alaska

### **OXPHO-BLUE AND PAPER TOWELS**

I use this myself right along and you might like to try it... when you have the barrel or action blued with Oxpho-Blue as per instructions and want a deeper, more iridescent finish, do this: very lightly dampen a piece of oil-free steel wool with Oxpho-Blue and swipe a small area on the piece being blued. Instantly vigorously rub this and a surrounding area with a crumpled brown paper towel. Practice will teach you how much and how far. On some types of steel the results are beautiful. Let stand without oil-



ing for a couple of days and then oil lightly - Do Not use one of the modern sophisticated rust preventives.

- Bob B.

### **OXPHO-BLUE AND STEEL WOOL**

Here is one for the books, not because I'm so smart, but just because I got so darn mad at an imported muzzle-loading pistol. The finish was terrible and I was asked to reblue it. I then found that it would not take a good hot blue. I tried twice with other barrels in the tank - results muzzle-loading barrel poor, other barrels good.

Then I tried some Oxpho-Blue; results very spotty. Then I got MAD, grabbed a piece of steel wool, #0000, to clean the barrel and when it hit the still active Oxpho-Blue; man-o-man, "beautiful". Finally, did the whole thing with a #0000 steel wool swab and rubbing hard using plenty of solution. The barrel came out like an old Colt blue and NO spots!!

- Harry Vorkink, Vancouver, Washington

### **OXPHO-BLUE AND T-4**

I had an old double in the shop the other day, rusty brown but not pitted too badly. I stripped and cleaned all parts with alcohol and rubbed with fine steel wool. I then put on four applications of Oxpho-Blue (cold) using steel wool after each coat. Then I rubbed on one coat of T-4 Dicropan and steel-wooled lightly. Result, dark rich blue. Looked real good. The T-4 seemed to cover all shadows and evened out the blue to an even color. Total time 45 minutes!

- E. R. Lowry, Roanoke, Alabama

### **ONE SATTIDY NITE AT THE MOVIES**

Years ago I was a small arms instructor for the New York City P.D. along with about 80 other talented men. One Monday morning, one of the instructors asked which of us had attended a local movie featuring Bettie Davis. No one answered - and maybe for good reason. It seems that during the Saturday night performance, when in the movie Bettie Davis shoots this guy with a little .25 ACP and gets all excited and says, "My God, what am I going to do now?", a deep voice from the audience boomed out: "Pick up your brass and move to the 50 yard line!"

- Fred Sadowski, Denver, Colorado

### **BROWNING DAMASCUS BARRELS**

The process is a simple dye operation, and while the original method used primitive materials, with modern materials the job is much easier.



Obtain 5-6 packages of common cloth dye such as "Tintex" or "Rit" in a dark brown color. Using a clean bluing tank,  $\frac{1}{2}$  full of water, add four or five packages of dye. This tank should be heated to 150 degrees max.

Prepare another tank with water and vinegar (acetic acid) in the proportions recommended on the dye package (2 cups to  $\frac{1}{2}$  tank of water). This tank should also be heated to 150 degrees.

Then proceed as follows:

1. Polish barrels only in the direction of spirals, never across or lengthwise.
2. Clean and boil as you would for bluing.
3. Place barrels in dye tank until you obtain a color darker than you want. Usually about 30 minutes. Don't worry about getting too dark.
4. Place in acid and water bath for 15 minutes.
5. Remove, water rinse under a facet or bath to remove any residue.
6. Flame dry, dry buff with loose cloth wheel - slow speed - to get the shading you like, then wax with beeswax and hand rub.

The important thing is to get the metal darker than you want the final color to be. You will lose some of the color in the acid bath. Suggest you try a scrap and time it to determine how long or how dark you want the final barrel to be.

You may also want to open the pores by swabbing the clean barrel with a weak solution of Nitric acid and water,  $\frac{1}{2}$  oz. acid to 12 ozs. water, before you put it into the first boiling bath, step 2.

Remember, the final buffing will create the shading you want.

- Howard Warner, Grinnell, Iowa

## RUST BLUING - AN OLD-TIMER'S WAY

The only equipment is a three-burner kerosene stove and a tank about 4" x 6" high x 40" long. First, wash the metal with trichloroethane, then boil in a fairly weak solution of lye water, followed by boiling in clear water. Next, swab straight muriatic (hydrochloric) acid on the metal (really slosh it on good), and wipe down with a clean cloth. Swab on Angier's formula for mercuric chloride and ammonium chloride, and again really wet it down good. Wipe the metal dry as quickly as you can.

Suspend the parts in a safe place and let them rust in the air. Boil in clear water and card off the rust. A second coating of the bluing solution is wiped on, but not as heavy, just enough to wet



without running. After about one hour, wet again with the bluing solution, and in about 24 hours do it a third time. When the rust comes, boil the parts in clear water and card. Usually get a good black in three or four passes. The final boil should have a little lye in it to prevent after-rust. Rub down well with heavy oil and after setting overnight, wipe off and reassemble the gun.

Customers are always well pleased with the color and how nice the guns look.

*- Bill Staeger as sent by Chuck French, DePere, Wisconsin*

### **"SECRET" BROWNING TOUCH-UP**

Sometimes after making repairs on an old .22 or a scatter gun, some metal is left bright instead of the usual well-used brown color. I "age" these spots with liquid tinner's flux. This is pretty strong acid and begins rusting very soon, depending on humidity. After you get a fine coat of rust, rub with steel wool. If it hasn't browned enough, let it work a day or 2 longer. When you get a pretty good match of color, scrub well with detergent and water, followed with a good spraying of oil. Better check in a day or so to make sure you killed all the action of the "secret" browning solution, however.

*- Jim Carberry, Placerville, California*

### **AGING BRASS M/L FURNITURE**

Recently I built a Kentucky Flintlock which came out so nice that it would have been fittin' for Dan'l Boone himself, except for the brasswork which made it look like rhinestones on a custom Mannlicher. After trying everything else, I tried some Oxpho-Blue. First I cleaned the brass with #0000 clean steel wool. Then I warmed it with a torch, and swabbed on the Oxpho-Blue after which I hit it again with the torch until dry. After this, I rubbed with a rough rag, and was I ever pleased! It made my Kentucky look like a million, and just the way I wanted it.

*- David Hepler, Pt. Mugu, California*

### **ANTIQUING WITH OXPHO-BLUE**

I have found another use for Oxpho-Blue that I've not seen in print. I have had good luck with it in touching up old tarnished brass and copper. After some repair work it makes it look as old as the original.

Just rub it on. I first tried it on an old powder flask and since then hundreds of other items. When you don't want'em looking shiny and nice, just rub on the Oxpho-Blue.

*- Gary Breeden, Des Moines, Iowa*



## ANTIQUING FOR THE AUTHENTIC LOOK

Casey's Aluminum Black does a really fine job of antiquing copper and brass for those who want the furniture on those new muzzleloaders to look authentic. Just slop it on, let it stand until the desired color appears, then dab it dry.

- Mike Fishcer, Boatrice, Nebraska

## BRASS AND NICKEL SILVER COLORING WITH OXPHO-BLUE

Have you tried your Oxpho-Blue on brass or nickel silver? I have and found that it does not produce quite the correct color for antique brass, but it sure beats the hell out of leaving the stuff looking like something fresh out of the variety store. The Oxpho-Blue on nickel silver rifle hardware followed by a little judicious polishing of the higher surfaces will produce a striking resemblance to "genuine oxidized silver". It looks quite more desirable than sterling silver on a rifle since the nickel silver is harder and less sensitive to the residue from black powder.

- Fred Riley, Tampa, Florida

## THE NIGHT WAS COLD AND STORMY...

...the snow building up in wind-swept drifts. But inside, the young gunsmith and his new bride sat together on the sofa, cozy and sheltered from the storm outside - alone, romantic, watching the glowing embers of the fire which cast a warm hue into the room. Silently, longingly, they gazed into each other's eyes. A question trembled on his lips. Her eyes were wide with wonder and anticipation. Two souls with but one single thought... which one was going out after more firewood? (GOTCHA, didn't we!! Guess we can tell who the dirty old men in this crowd are!)

- Fred Moulten, Washington, D.C.

## MODERN EQUIVALENTS FOR OLD GUNSMITHING FORMULAS

This is the list I have been building for quite a number of years of all the old names and formulae that I have come across relating to gun work. Do hope it is helpful. (Note: we received this list from Dave first in 1973 or '74, with an update in 1975. We'll run any further updates in subsequent volumes of **Gunsmith Kinks** as they come in. Frank B.)

### COMMON OR OBSOLETE NAME

acid potassium sulphate  
acid of sugar  
alkali volatil

### CURRENT NAME

potassium bisulfate  
oxalic acid  
ammonium hydroxide

### FORMULA

KHSO<sub>4</sub>  
H<sub>2</sub>C<sub>2</sub>O<sub>4</sub>·2H<sub>2</sub>O  
NH<sub>4</sub>OH



**COMMON OR  
OBSOLETE NAME**

alcohol sulphuris  
alumina  
ammonia  
antimony black  
antimony bloom  
antimony glance  
antimony red  
antimony vermilion  
aqua fortis  
Aqua Regia

bitter salt  
blue copperas  
blue salts  
blue stone  
blue vitriol  
bone ash  
bone black  
brimstone  
butter of antimony  
butter of tin  
(Glyceryltrinitrate =  
Nitroglycerine)  
butter of zinc

T.N.T. Tri-Nitro-Toluene

calomel  
caustic soda  
chili nitre  
chili saltpeter  
chromic acid  
copperas  
corrosive sublimate  
corundum  
ferro prussiate  
flores Martes  
flowers of sulfur  
grain alcohol  
green vitriol  
Hard Oil  
iron perchloride  
iron pernitrate  
iron protochloride  
iron persulphate  
jeweler's etchant

killed spirits  
K.N.S. solution

lime  
liver of sulphur

lunar caustic

**CURRENT NAME**

carbon disulfide  
aluminium oxide  
ammonium hydroxide  
antimonytrisulfide  
antimony trioxide  
antimony trisulfide  
antimony oxysulfide  
antimony oxysulfide  
nitric acid  
nitric acid + hydrochloric  
acid  
magnesium sulfate  
copper sulfate  
nickel sulfate  
copper sulfate  
copper sulfate  
impure calcium carbonate  
animal charcoal  
sulfur  
antimony trichloride  
anhydrous stannic chloride  
+  $\frac{1}{3}$  its weight in water  
  
zinc chloride +  $\frac{1}{4}$  its  
weight in water

mercurous chloride  
sodium hydroxide  
sodium nitrate  
sodium nitrate  
chromium trioxide  
ferrous sulfate  
mercuric chloride  
aluminium oxide  
potassium ferricyanide  
anhydrous ferric chloride  
sulfur  
ethyl alcohol  
ferrous sulfate  
boiled linseed oil  
ferric chloride  
ferric nitrate  
ferrous chloride  
ferric sulfate  
3g. silver nitrate + 3g.  
nitric acid + 3g. mer-  
curous nitrate + 100cc  
 $H_2O$   
zinc chloride  
10g. ammonium carbonate  
+ 20g. ammonium per-  
oxydisulfide + 200cc  
ammonium hydroxide  
calcium oxide  
melted potassium  
carbonate  
+ sulfur  
silver nitrate

**FORMULA**

$CS_2$   
 $Al_2O_3$   
 $NH_4OH$   
 $Sb_2S_3$   
 $Sb_2O_3$   
 $Sb_2S_3$   
 $Sb_2S_3 + Sb_2O_3$   
 $Sb_2S_3 + Sb_2O_3$   
 $HNO_3$   
 $HNO_3 + 3HCl$   
  
 $MgSO_4 \cdot 7H_2O$   
 $CuSO_4 \cdot 5H_2O$   
 $NiSO_4 \cdot 7H_2O$   
 $CuSO_4 \cdot 5H_2O$   
 $CuSO_4 \cdot 5H_2O$   
 $CaCO_3 + ?$   
...  
 $S$   
 $SbCl_3$   
 $SnCl_4 + H_2O$   
  
 $ZnCl_2 + H_2O$   
  
 $HgCl$   
 $NaOH$   
 $NaNO_3$   
 $NaNO_3$   
 $CrO_3$   
 $FeSO_4 \cdot 7H_2O$   
 $HgCl_2$   
 $Al_2O_3$   
 $K_3Fe(CN)_6$   
 $Fe_2Cl_6$   
 $S$   
 $C_2H_5OH$   
 $FeSO_4 \cdot 7H_2O$   
...  
 $FeCl_3 \cdot 6H_2O$   
 $Fe(NO_3)_3 \cdot 9H_2O$   
 $FeCl_2 \cdot 4H_2O$   
 $Fe(SO_4)_3 \cdot nH_2O$   
 $HgNO_3 \cdot H_2O +$   
 $AgNO_3 + HNO_3 + H_2O$   
  
 $ZnCl_2$   
 $NH_4CO_3 \cdot H_2O +$   
 $(NH_4)_2S_2O_8 + NH_4OH$   
  
 $CaO$   
 $K_2CO_3 + S$   
  
 $AgNO_3$



COMMON OR OBSOLETE NAME	CURRENT NAME	FORMULA
muriate of mercury	mercuric chloride	$\text{HgCl}_2$
muratic acid	Hydrochloric acid	$\text{HCl}$
nitre	potassium nitrate	$\text{KNO}_3$
nitrate of silver	silver nitrate	$\text{AgNO}_3$
Nordhausen acid	fuming sulfuric acid	$\text{H}_2\text{SO}_4 + \text{SO}_3$
oil of Mars	deliquescent anhydrous ferric chloride	$\text{FeCl}_3 + \text{H}_2\text{O}$
oil of vitriol	sulfuric acid	$\text{H}_2\text{SO}_4$
orthophosphoric acid	phosphoric acid	$\text{H}_3\text{PO}_4$
oxymuriate of mercury	mercuric chloride	$\text{HgCl}_2$
oxymuriate of potassium (explosive if crushed)	potassium chlorate	$\text{KClO}_3$
pearl ash	potassium carbonate	$\text{K}_2\text{CO}_3$
plumbago	graphite	---
potash	potassium carbonate	$\text{K}_2\text{CO}_3$
prussic acid	hydrocyanic acid	$\text{HCN}$
purple crystals	potassium permanganate	$\text{KMnO}_4$
quicksilver	mercury	$\text{Hg}$
red prussiate of potash	potassium ferricyanide	$\text{K}_3\text{Fe}(\text{CN})_6$
sal ammoniac	ammonium chloride	$\text{NH}_4\text{Cl}$
salts of lemon	potassium acid oxalate, 5% solution	$\text{KHC}_2\text{O}_4, \text{H}_2\text{O}$
salts of sorrol	potassium acid oxalate	$\text{KHC}_2\text{O}_4, \text{H}_2\text{O}$
salt of tartar	potassium carbonate	$\text{K}_2\text{CO}_3$
Salt of vitriol	zinc sulfate	$\text{ZnSO}_4, 7\text{H}_2\text{O}$
salt of wormwood	potassium carbonate	$\text{K}_2\text{CO}_3$
salt peter	potassium nitrate	$\text{KNO}_3$
sal volatile	ammonium carbonate	$(\text{NH}_4)_2\text{CO}_3$
slaked lime	calcium hydroxide	$\text{Ca}(\text{OH})_2$
salts of hartshorn	ammonium carbonate	$(\text{NH}_4)_2\text{CO}_3$
soda	sodium carbonate	$\text{Na}_2\text{CO}_3$
soot	carbon	$\text{C}$
Spencer's acid	3g. silver nitrate + 3g. nitric acid + 3g. mer- curous nitrate + 100cc $\text{H}_2\text{O}$	$\text{HgNO}_3, \text{H}_2\text{O} +$ $\text{AgNO}_3 + \text{HNO}_3 + \text{H}_2\text{O}$
spirits of hartshorn	ammonium hydroxide	$\text{NH}_4\text{OH}$
spirits of salt	hydrochloric acid	$\text{HCl}$
spirit of nitrous ether	ethyl nitrite	$\text{C}_2\text{H}_5\text{NO}_2$
spirits of wine	ethyl alcohol	$\text{C}_2\text{H}_5\text{OH}$
sulphuric ether	ethyl ether	$(\text{C}_2\text{H}_5)_2\text{O}$
sweet spirits of nitre*	ethyl nitrite solution with ethyl alcohol	$\text{C}_2\text{H}_5\text{NO}_2 + \text{C}_2\text{H}_5\text{OH}$
tetrachloromethane	carbon tetrachloride	$\text{CCl}_4$
tincture of ferric chloride	ferric chloride + ethyl alcohol	$\text{FeCl}_3, 6\text{H}_2\text{O} + \text{C}_2\text{H}_5\text{OH}$
tincture of steel	ferric chloride + ethyl alcohol	$\text{FeCl}_3, 6\text{H}_2\text{O} + \text{C}_2\text{H}_5\text{OH}$
tin salt	stannous chloride	$\text{SnCl}_2$
verdigris	copper acetate	$\text{Cu}(\text{C}_2\text{H}_3\text{O}_2)_2, \text{H}_2\text{O}$
vitriol	sulfuric acid	$\text{H}_2\text{SO}_4$
water glass	sodium silicate	$\text{Na}_2\text{SiO}_3, 9\text{H}_2\text{O}$
whiting	calcium carbonate	$\text{CaCO}_3$
yellow prussiate of potash	potassium ferrocyanide	$\text{K}_4\text{Fe}(\text{CN})_6, 3\text{H}_2\text{O}$

\* Sweet spirits of nitre is a pharmacological preparation and is available at your druggists'. A 1 to 21 mixture of ethyl nitrite to ethyl alcohol 95% is a close approximation.



"Butter" generally refers to the chloride, but may also describe a semi-solid mass.

"Caustic" generally refers to the hydroxide of a metal.

"Flowers" generally refers to the oxide, and exceptions include flowers of sulfur, which is purified sulfur powder.

"Muriate" generally refers to the chloride.

"Vitriolate" generally refers to the sulfate of a metal.

Gun Cotton - Cellulose Hexanitrate

Nitrocellulose - Cellulose Hexanitrate

Persulfate may refer to the - Peroxydisulfate

- *Dave Byron, Casselberry, Florida*

## **COPPER SULPHATE IN THE WATER SUPPLY**

Along about this time every year we get frantic phone calls from customers spotted here and there over the country - more especially in the south - saying their bluing bath had suddenly ended its pretty little life for no reason what-so-ever. This has been a real head-knocker . . . and it wasn't until just last week that the answer came in the way of a comment from one who had phoned in with such a problem. His comment: ". . . and I wonder about my water. We get ours here from a reservoir and they've just added tons of copper sulphate to kill the algae." Great Day In The Morning, of course - copper. Practically every town in the country that gets its water from lake, stream, pond or large impoundment has to treat their water supply when the weather gets hot and stays that way. Copper sulphate is the universal treatment. A wee, wee trace of that stuff is fatal to the bluing bath . . . worth knowing.

- *Bob B.*

## **DUNK IMMEDIATELY TO PREVENT SPOTS ON BLUING**

My bluing was spotting immediately after taking the work from my bluing tank. The solution was embarrassingly simple: I was so conscious of loss of the bluing chemicals from dragout that when I took the work from the tank I was careful to let every bit of it that would drain back into the salts tank. While all this was going on, of course all the krud etc. from the top of my bath dried upon the work . . . causing the spotting on the blue.

I found that if I dunked the work immediately into the rinse tank after coming from the bluing tank - without any delay - the problem was eliminated.

- *Louie Thomas, Bear Creek, North Carolina*



## SPOTS IN YOUR BLUING AND THAT "LOUSY CITY WATER"

These spots were not noticeable until the bluing was completed, then the gun looked like it had the measles. In talking the problem over with another gunsmith in the area, he remarked that he had had the same problem because of the lousy city water. He had cured it by taking the guns out of the 909 cleaning tank and dunking them in a tank of boiling water. A few dunks did the trick and then put the guns immediately into the bluing solution. I tried it, it worked great and cured the measles. (Note from FB: Another cure for this problem is to get one of the charcoal water purifier filters from Sears. Uses a throw away charcoal filter cartridge and altho made to be put into the water line, I hooked mine up with a garden hose and a shut off faucet and can run water into whichever tank I want to. The plumbing requires a little ingenuity, but that's half the challenge!)

- Henry Fishetti, Berkely Heights, New Jersey

## WATER FILTER FOR BLUING

Our water around here has lots of minerals and "stuff" in, so to be sure not to ruin my bluing salts, I always filter it over charcoal. I took one of those big plastic pails and drilled small holes in the bottom, then put in about a 4-6" layer of coarse-ground charcoal; the stuff you buy for fish aquariums (not the fine dusty stuff, but not those briquettes used for barbecuing, either. Somewhere in between.) Then just pour the tap water through the filter bucket into another plastic bucket below it. My bluing has been coming out beautifully ever since I started this - and I mean beautiful!" (Funny how the simplest things can make such a difference... just requires a little logic to figure out. B.B.)

- Butch Martin, Kresgerille, Pennsylvania

## THE BIGGER THE BETTER

Young man overheard in the local flower shop: "I want something to go with a weak alibi."

- Fred Moulton, Washington, D.C.

## FOR THE MOUNTAIN MEN

I blue at 280-285° in this 6000 ft altitude and have never had to reblue one here in Cheyenne. Even the 03-A3's are black as pitch. If I go to 290° or over, I get coated streaks, but lowering the temperature dissolves them.

- Francis A. Green, Cheyenne, Wyoming



### **BLUING NICKEL STEEL**

Put the nickel steel parts in the bath at 250 degrees and run the temperature up to 310-315 degrees. Leave it 15-20 minutes and keep checking until the parts turn blue. Then drop the temperature back to 285-290 degrees and leave the parts in until they look good, usually another 15-20 minutes. By the way, the only parts you can blue in a bath operated this way is nickel steel 'cause if you've got anything else in there, it will turn red on you.

- *F.C. Bailey, Carson City, California*

### **BLUING THE BROWNING BT-99 TRAP GUN**

After the first 15 minutes in the bath, I could see that the receiver was not bluing as usual. It had light grey streaks and several areas of red and purple coloration. I pulled it from the bath and immersed it in cold water and scrubbed with clean steel wool. Then back into the bath for 15 minutes at 292 degrees F, and then I slowly raised the temperature to 304 degrees F. I held it there for 10 minutes and then removed the receiver. The bluing was perfect, as I would expect from Oxynate No. 7. My bath had been cleaned with Bluing Solution Cleaner and did have Oxynate S in it too.

- *Maurice Kelly, Paoli, Pennsylvania*

### **PAPER TOWEL THAT BLUING JOB**

When I find a customer wants a really bright shine on a job after it'd blued, I take several paper kitchen-type towels and rub them all over the complete gun. What do I get - a mirror finish. It even works when the gun has been blued for a while and the bright finish has been dulled by handling and an oily cloth. Comment from Bob B.: We used to do this in our shop, lo these many years ago when Ben Neuman (from whom I learned so awful much about bluing) used to rub all the guns down the next day after they were blued with a cheap brown paper towel - the kind we all grew up with in the school lavatory. When the job looked a little uneven, we would warm the gun over a clean heat source (like the pipeburner), and then coat liberally with lightweight mineral oil (from the drug store), and set away for overnight. Then, next morning, rub it down with the rough brown paper towels like you were polishing the family silver. This really blended the streaks caused by variations in the metal and gave everything a "mile-deep" look. By the way, this does not work if you use good quality or soft paper towels; gotta be the coarse ones.

- *Vernon Gruver, known as "Preach" to his friends, Bixby, Oklahoma*



## **BUBBLES IN YOUR BLUING BATH, A GOOD TANK COVER, AND OTHER ODDS & ENDS**

Anytime your bluing bath is up to operating temperature and you are getting a lot of bubbles coming up through solution, you do not have enough water in the tank. It's an old rule of thumb that has stood us very well.

Be sure that your tank is covered between uses, and if you haven't used your tank for quite a while, bring it up to operating temperature and then run a bunch of old parts and odds and ends from the salvage box to be sure that it is going to be operating correctly before you put in a good piece to be blued. Also, be sure that the top of the tank is always skimmed clean and kept free of dead salts and other floating crud.

Every time we mix a fresh new batch of salts and get it balanced out at the proper operating temperature, we then make a "water gauge line" which is nothing more nor less than a little piece of black iron wire bent to hang across at the water level in the tank. This tells us at a glance when our water level is getting low and acts as a backup indicator and warning device to let us know that we need to add water or we're going to start losing control of the temperature and possibly lose the bath. Saves the boys lots of time in the bluing room and gives you an additional positive check.

*- Ralph Walker, Selma, Alabama*

## **CURING BLUING SALTS "BURNS"**

I always immediately sponged those splashes of hot bluing salts with vinegar, but they seemed to leave a bad sore no matter how fast I got to them. Whilst visiting with a doctor friend of mine, I told him about the problem, and he recommended putting pure vanilla extract on the spots after sponging with the vinegar. I did, and it worked beautifully and healed up real fast. (Note by Bob B. - if you have those so-called buffalo knats in your part of the world in the summer and find that nothing keeps them away, apply a bit of pure vanilla extract (must be the real McCoy) on exposed areas. Does the trick!)

*- Bixby Gunsmith Shop, Bixby, Oklahoma*

## **CURING THE INCURABLE**

A pretty young thing goes to her doctor's one morning, most disturbed. "Doctor," she says, "I keep breaking wind. Now it doesn't seem to be a problem, for there is no smell and no noise, but I really would like to get it stopped." So, the doctor gives her a big bottle of horse pills, tells her to go home and take 4 a day for

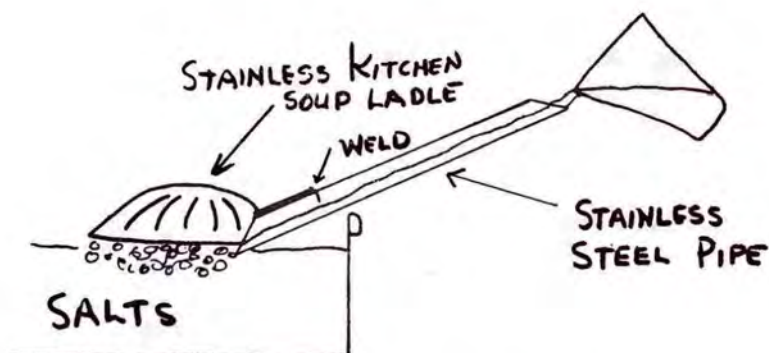


2 weeks and come back. After 2 weeks she is back and mad, fit to be tied. "Doctor," she complains, "these pills aren't any good at all. Why they didn't cure a thing, and now the smell is just terrible!" "Ah hah," says the doctor, "we're making some progress. Now that we have the sinuses cleared up, let's see what we can do about those ears."

- Dean Grennell, *Gun World*, Capistrano Beach, California

### ADDING WATER TO BLUING BATH

During the course of 12 years of gun building and repair I have come up with some ideas which may be of some interest to you or to others. There must be numbers of ways to add cold water to hot boiling bluing salts. (As those of you have labored over the bluing tanks so well know, adding water is an absolute MUST for temperature control - Bob B.) I have tried various methods but finally made up a unit with which I can add any amount of



water to the salts quite safely. Following (above) is a sketch of this unit as it looks in use. Some caution is still required and the water cannot be added too rapidly because the salts can work their way back up the filling tube.

- Wally Philipiaw, *Prince Rupert, British Columbia, Canada*

### RUST REMOVER SOLUTION "PIPE"

For soaking rifle and shotgun barrels in rust remover, get a 3 foot length of 3" plastic pipe and glue a cap on one end. Mix up the rust remover, pour it in, followed by the long parts you want to clean up, and stand in a corner until the job is done. Works easy, doesn't take much chemical or room and you can slip another cap over the open end to keep it covered until the next time you need it.

- D. R. Smith, *Council Bluffs, Iowa*



## STAINLESS STEEL TANKS NOT SO HOT FOR RUST REMOVERS

Bill thought the trade should be advised NOT to store their rust remover in stainless tanks. He did and, after a few weeks, it let the remover end up on the floor!

- William Cabe, Gaston, North Carolina

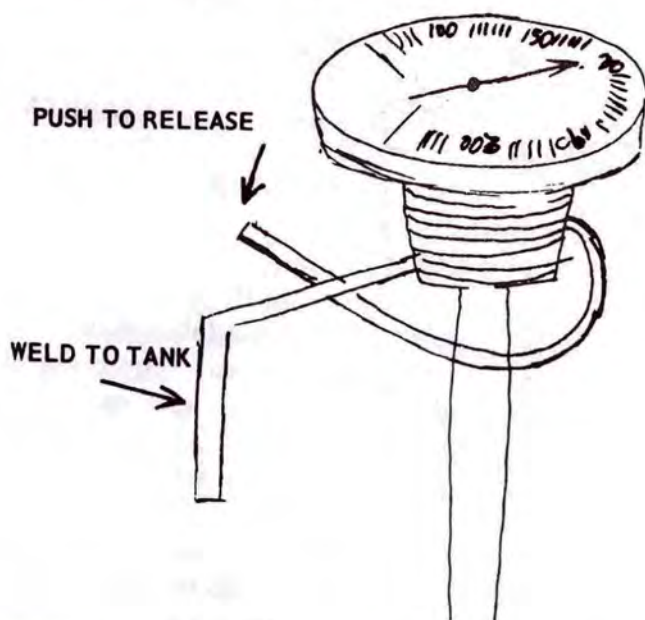
## BLUING TANK STAND NO-NO

When I first set up my bluing tanks I had some 1 inch aluminum angle laying around so I used it for the tank holders. **BAD IDEA.** After about a month the salts dissolved the stands and if I hadn't noticed it in time I would have lost all my salts. I was lucky it didn't happen when the tanks were going full blast. Mightly dangerous!

- Michael Moore, Guilderland, New York

## BLUING THERMOMETER HOLDER

In case no one has thought of it yet... When I needed a stand for your bluing thermometer I took some scrap iron rod from a



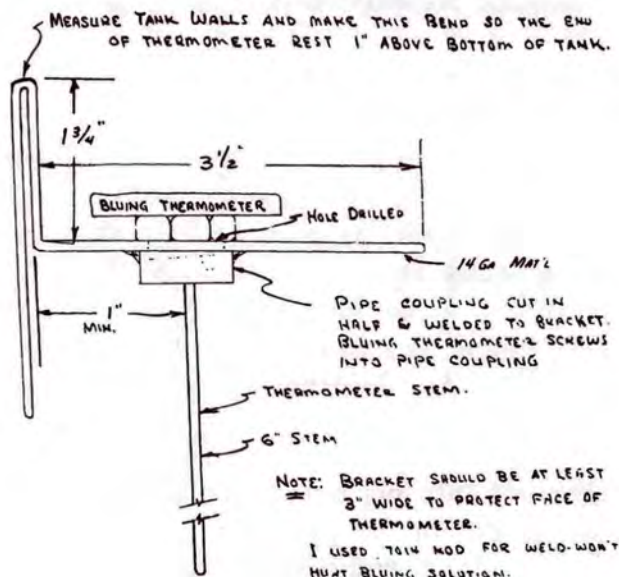
book rack. I bent it into a configuration shown above. It works perfectly, and the springiness of the steel allows me to remove the thermometer easily after bluing. Thermometer is kept 1" from the bottom and side.

- Michael C. Margrill, Orange Lake, Florida



## BLUING THERMOMETER BRACKET

I couldn't find anything in the way of a bracket for holding the



bluing thermometer, so I made the one shown above. It may look like a lot of trouble and may take a little time, but it is a bracket that will last and protect my investment... just an idea some of the rest of the fraternity may be interested in.

- Littlejohns Gunshop, Fresno, California

## PRESERVING DE-GREASED STEEL WOOL

Tried everything suggested for cleaning steel wool but always had problems keeping it any length of time. In complete frustration I tried BLUING it. It works perfect. I laid the wool in my salts and left them float around while bluing a gun. Then ran it thru the rinse and into the cold rinse to stay. NOT INTO THE OIL BATH!! Have been using the first piece about three months and it's still as good as the day I reblued it!

- Gregg Simon, West, South Dakota

## CURING THE OILY STEEL WOOL BLUES

Cleaning oily steel wool is really easy now that I started using my wife's dish detergent (brand she uses is Dove, but suppose any good one would work). I tried everything from burning off the oil (and having only ashes left), to all the various solvents and chemicals. After washing I rinse thoroughly in fresh water (the Steel



Wool, not me) and dry it over a hot air register. Once I got onto doing this I have been having no problems. Besides, what could be easier!

- Robert Goodman, Ketchikan, Alaska

### **CURE RINSE & CLEANING TANK RUSTING**

I had a slight problem with my rinse tanks rusting between bluing sessions. Since oiling the tanks could cause problems, I figured I would just have to put up with the rust. However, this is not the case anymore! Now, as soon as I finish bluing I drain my rinse and cleaner tanks and spray them with the rust inhibitor **HOLD** that you sell. I no longer have a rust problem and it doesn't effect the bluing as I've been doing it several months.

- Benjamin Rollins, Jr., Goldsboro, North Carolina

### **AND THEN...**

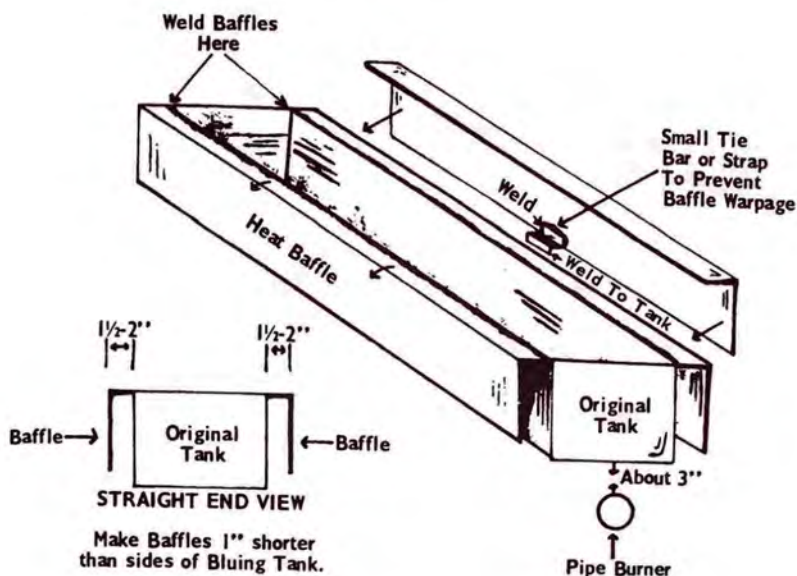
The preacher got into his pulpit one Sunday morning and addressed his congregation in thundering tones: "Brothers and Sisters, this Sunday I am going to preach on the sins of my congregation. There are those of you who are sinning great sins in the eyes of the Lord. I shall name names and point the finger"... Just then a very ripe tomato hit him splat! full in the face. With absolute composure and dignity the preacher took a large red bandana handkerchief from his inside frock pocket, carefully wiped the tomato from his face, returned the handkerchief to his pocket and in the same voice proceeded... "and there are women amongst you living as Jezebels. Yea, sin and evil are rampant. A Jezebel and a certain Deacon"... And right then a very well-aged egg hit him full in the face. Again with utmost dignity all traces of the assault were removed with the bandana. Leaning over the pulpit toward his flock, his large hands resting on its edge, the preacher - who was a big man - said in a patient, calm voice: "Brothers and Sisters, for the next 30 minutes I shall preach on the word of the Lord and the wages of sin, and then... well, then there's going to be the Goddamndest fight you ever saw!"

- Bob B.

### **HEAT SHIELDS FOR BLUING TANKS**

In these days of much higher gas costs, all of you might find it valuable to "skirt" your tanks as I did 40 years ago when I was so hard up I had to save money everyway possible. Such baffles are easy to make and can be welded (NOT brazed) to your present bluing tanks. Not only saves gas, but makes the tank nicer to work over. Here's how they look:





The purpose is quite obvious - holds the heat to the sides of the tank and gets more use out of it. Should be made of black iron - 22 gauge or whatever. To prevent warpage, a tie-bar can be welded to the sides of the tank at the center and the center of the baffle. Be sure that you leave the ends open - the burned gases must vent out the ends of the baffles.

- Bob B.

## WALL IT IN, CLOSE IT UP

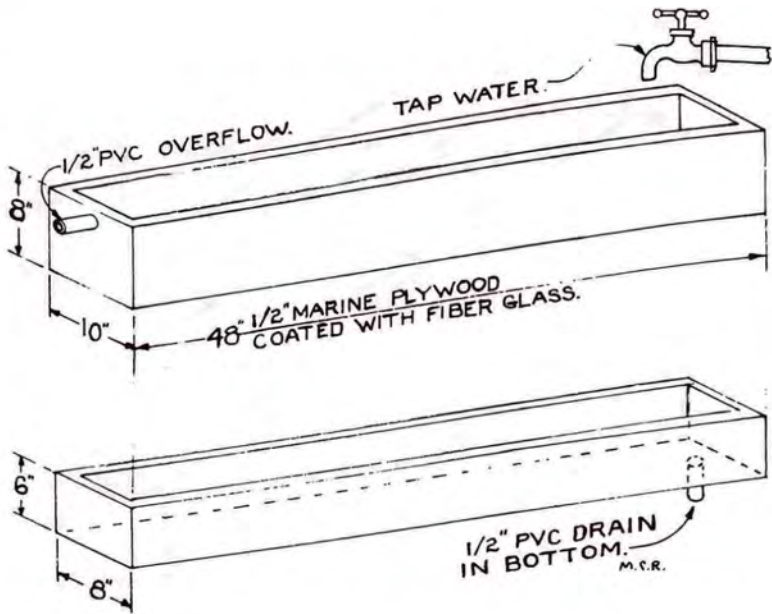
My bluing tanks are located in a room separated from the rest of the shop and I just open a large, double door to provide ventilation. Especially during the winter, the air blowing through the room disturbed the burners' flames and seemed to pull heat away from the tanks. To stop this I just stacked bricks and cement blocks around the base of my whole set up. They go around all four sides leaving just enough room for the piping to get thru. It's easily taken down for cleaning, etc. Not only solved the "flickering flame" problem, it also cut down heat-up time and made it much easier to maintain the proper temperature.

- Bob Barnard and Reid Coffield, Rutherfordton, N.C.

## FIBERGLAS-COVERED PLYWOOD TANKS

Here are two tanks that I made for my shop out of plywood and fiberglass. The first one is a rinse tank which allows contin-



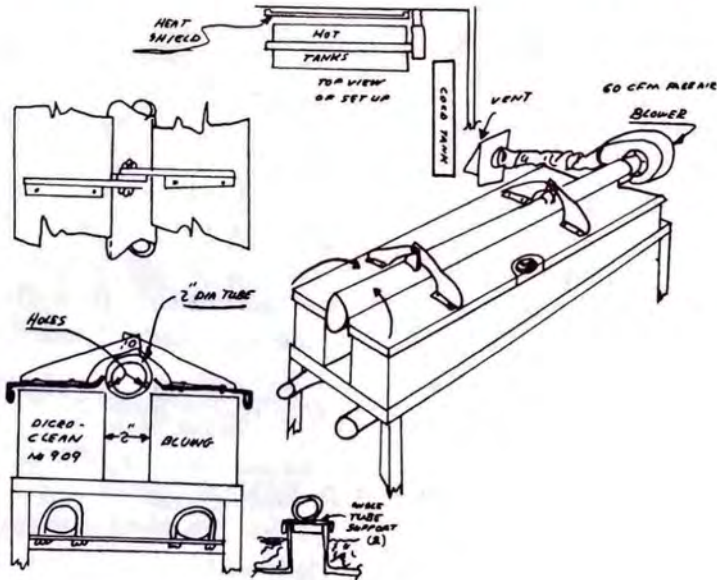


uous flow of fresh water in the tank. The second one is for cold solution, such as oils, where a bottom drain would be useful.

- Loran Cogburn, Wauchula, Florida

COVERED BLUING TANKS

Here is the set-up that I use. It has hinged covers and a blower to remove heat & fumes, and it automatically keeps the tanks covered. I have set up a schedule and blue 5 to 7 guns every



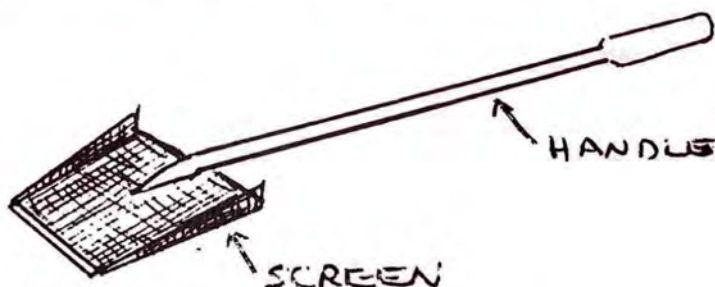


3 weeks with July and August off, (it's too darn hot!) and I have gone 2 years without changing bluing solution. I use two test pieces of barrel and alternate each piece every other bluing, and compare the results. I use the Bluing Solution Cleaner and Oxynate-S in the tank.

-Jack Gutridge, Dyer, Indiana

### WIRE MESH SCOOP

The sketch is of a steel wire mesh scoop that I made up to clean out the bottom of my bluing tank. The steel screening is like heavy-duty window screening, but used to be used somehow in the wheat farming industry. Just shape the sides and bottom to the general contour of your bluing tank.



Use the tool to scoop sludge and crap out of your tank without taking out too much of the good solution with it. And, when adding water to the hot solution, pour the water through the screen while dragged it across the top of the bath. Greatly reduces spatter, and the cold water is distributed over a large area.

-Darrel Harrison, Cut Bank, Montana

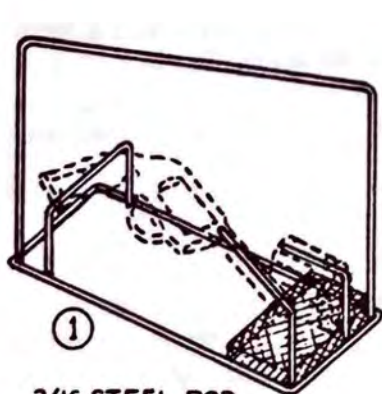
### HANDGUN BLUING RACK

Here are the racks I use when I blue a pistol or revolver. They are made from  $\frac{3}{16}$ " steel rod, welded (not brazed) together. The dimensions are dictated by the size of the tank you have, but should fit inside the tank and sit on the bottom.

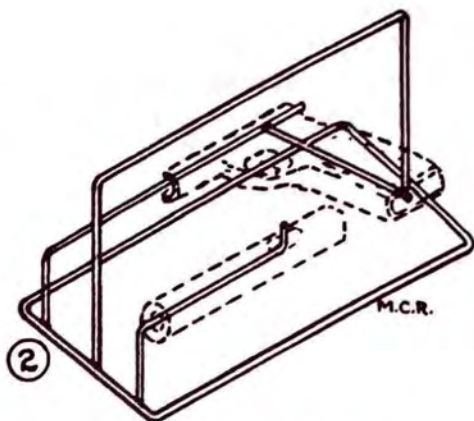
The configuration shown in Drawing #1 can be used for most revolvers, changing the dimensions to fit different frames and barrel lengths. Construction should be such that the frame or parts contact the rack on an unpolished surface, ie; inside barrel, inside cylinder, under pistol grip, etc.

Drawing #2 shows the configuration I use for most autos, and again the gun will dictate the size. The next racks I make will also have a small parts basket incorporated into the bottom of the





①  
3/16 STEEL ROD,  
WELDED CONSTR.

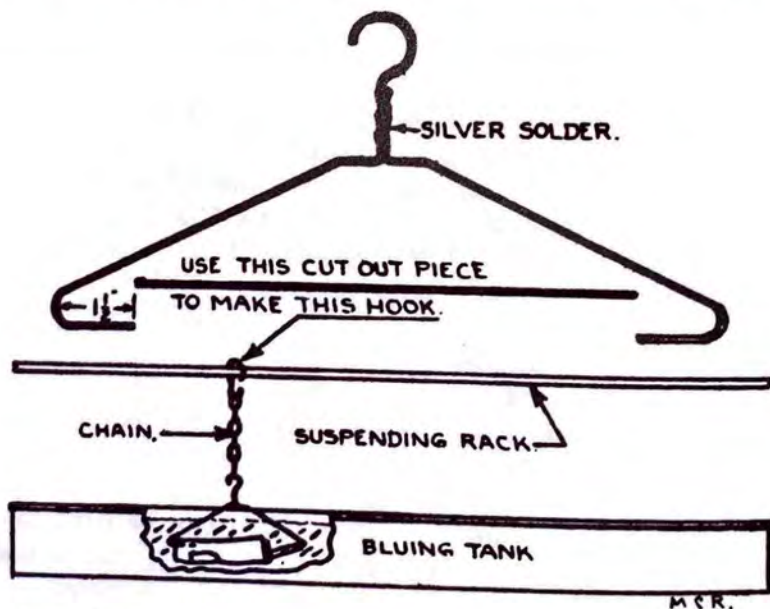


rack; that way all parts will be together. (I showed this in the drawing for you.)

-Jim Thompson, Topeka, Kansas

### BLUING PARTS "HANGER"

I use this hanger when bluing shotgun receivers, revolver and pistol frames, and rifle actions. It is made from a coat hanger with



part of the bottom cut out. Clean off the paint, and silver solder the joint where the ends are twisted. Use a chain and an overhead rack to suspend the parts... which eliminates a mess of wires across the bluing tank. After bluing, rinse and oil-dip the parts, and hang up to cure.

-Gary Polo, Esko, Minnesota



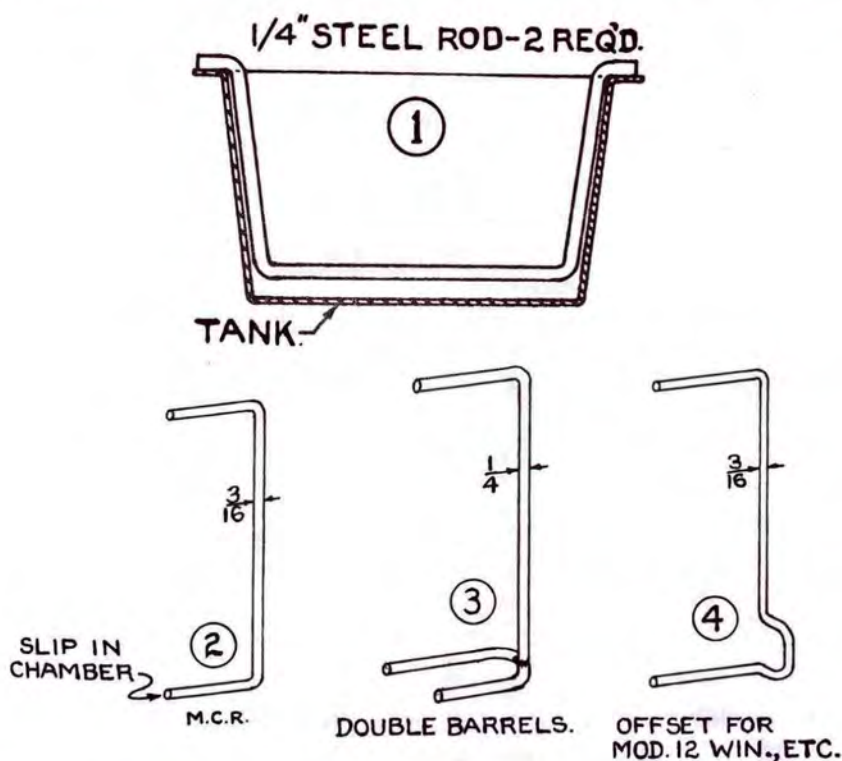
## CYANIDE IN HOT BLUING - WARNING!!

Kinks I Oxybate No. 7 Bluing Instructions suggests using cyanide in your hot bath. DON'T!! Cyanide in the presence of acid releases deadly cyanide gas - the stuff they use in gas chambers. With vinegar (an acid) the common neutralizer for alkali salts splashes/burns, the potential for a life-threatening accident is just too great. DON'T USE CYANIDE ANYWHERE!

- *The Crew at Brownells*

## BLUING TANK RACKS AND PARTS HOOKS

Here are a few of the special hooks I made up for use when bluing. #1 is made up in pairs and shaped to fit the inside contour



of your tank. They support barreled actions and barrels, and you put one at each end of your work. #'s 2, 3 and 4 are special hooks used to lift various types of barreled action from the tank easily.

- *Jim Thompson, Topeka, Kansas*

## WAKE UP WILLIE...

This fellow lived out in the mountains of Colorado and he and his buddy, Willie, wanted to get truck driver licenses. One of them really shouldn't have taken the test but take it he did. The ex-



aminer could see it was going to end sadly so, to make it easier on the fellow, he posed the following question, thinking he would realize he was stumped and not go on:

"You're driving down this ice covered pass with a tanker of hi-test gas. Your brakes fail. There are no guard rails. It is 1000 feet straight down; 1000 feet straight up on the other side. You round a curve and there is a semi jack-knifed across the road, blocking it completely. What will you do? Your partner is in the sleeper!"

Says the applicant without a pause: "Wake Willie." The examiner is somewhat taken aback. "Wake Willie? What in the devil for?" "So he can see the damndest accident ever was..."

- Bob B.

## HAND BRONZING

*The following article appeared in "Der Büchsenmacher", April 1959, Number 4. We chose to use a translation as close to the literal meaning of the original text as was possible. This has occasionally resulted in unusual word usage or sentence construction; however, we think it is very important to keep the author's original context and intent so as not to mislead you as you work your way through the instructions.*

*Read these instructions carefully...they are extraordinary!! They are particularly enlightening for us youngsters who have grown up with the "high speed bronzing compounds", as the author comments. The author deserves great praise for his command and understanding of browning and bluing, and his willingness to tell how to do it. Personally, I love 'em!*

*By the way, "Bronzing" is the German term for what is being done. We left it that way because you can get either brown or black color depending on the way you do it - so wouldn't be right to call it either "Browning" or "Bluing". - Frank B.*

Burnishing or bronzing steel parts, especially of gun barrels is very old and may have been used by armorers even before the invention of firearms. Bronzing can only be proven to have been used since 1613. A firearm, known to have been manufactured in that year, shows a damascened and bronzed barrel. It was found in a museum in Paris.

The object of bronzing was the beautification of the weapon and to emphasize the damask barrels of the time, which in burnished or bronzed condition show the damask pattern beautifully. Engravings and inlays of gold and silver were furthermore accentuated by the dark background of the bronzed iron and became



prominent, especially in the case of silver. The attempts to connect the decoration and beautification of the weapon with saga, poetry and custom played at all times an important role. In addition, the bronzing should prevent destruction by rusting. Much later the requirement to prevent reflection by sunlight became prevalent and may even today be a main reason for bronzing. It is obvious that a hunter does not want to alarm the game by a light-reflecting barrel.

Steel parts which have not been bronzed show a real inclination towards rusting and have to be cleaned with scouring powder in order to remove the rust. The continuous use of these abrasive powders on these steel parts leads unavoidably to heavy wear, which can be prevented by bronzing.

The application of the bronzing process in earlier times was repeatedly followed by periods during which the process was not used and so it is not possible to construct a continuous history.

The process in the past was a trade secret of the master gunsmith and was mostly handed down by word of mouth. This knowledge often remained a family secret, which was guarded rigorously and therefore it is understandable that few documents are available which can shed light on the bronzing process. Furthermore, the procedures of the particular masters were so different, that in the few documents which are available, many strongly diverging statements can be found. Even today the processes and bronzing solutions are kept secret. In any case each particular job depends on the know how of a competent master. The recipes and procedures often have been lost and the contemporary master rather falls back on the simpler high speed bronzing compounds, although the real danger exists, that especially in assembled parts, the solder seams are destroyed or at least strongly affected.

That the education of the new generation suffered under these conditions of secrecy is clear.

The argument that the oxidation as practiced in the hand process takes more time and therefore is more expensive does not hold water. This argument comes from masters who are not knowledgeable and experienced with respect to the hand bronzing process, which they do not use often enough. Besides this, it is quite possible to limit duration of the work for hand bronzing to one day and still achieve a durable and black coating. The treatment with antimony trichloride (butter of antimony) is the oldest process for bronzing of a gun barrel. The butter of antimony was mixed with olive oil and this mixture applied to the barrel by brush. After the application, the barrel is dried and subsequently brushed. This process is repeated as often as it is necessary to achieve the



desired color. Finally, the barrel is coated with soft wax or with an alcoholic varnish containing shellac and dragon's blood. Dragon's blood is a rosin which is obtained from a palm tree "*Calamus draco*" which is found in India and the Malay Islands. Other species are found in America.

Another old procedure, of English origin, is the treatment of the barrel with dilute sulfuric acid. The barrel was thinly wetted with the diluted sulfuric acid and smoked over a coal fire. After this the barrel was placed in a hole in the ground or in a moist cellar in order to induce rusting. After sufficient rusting (16 - 20 hours) the barrel was scratched or brushed and again treated with acid and smoke. This process was repeated until the desired color was obtained. The color is said to be very beautiful and durable, but is expensive because the slow formation of the oxide layer is time consuming. Besides, the coal has to be sulfur free, and this is seldom the case. In any case, the smoking procedure as described here, can be applied when other bronzing compounds are used and will really deepen the color. It is not absolutely necessary that the smoking be done over a coal fire as we will see later.

A special bronzing procedure is the bronzing of Damask (or Damascus) barrels, which today is hardly known and is not being used any more. The damask barrel is lightly wetted with a bronzing solution and, after subsequent rusting, the loosely adhering rust is removed with a wire brush. This process is repeated as often as is necessary to bring up clearly the pattern of the damask barrel. After every wetting, smoking may be applied. Heating in boiling water, which is usually done to neutralize the acid residues, is not carried out in order to prevent the formation of a black color, but to preserve the known brown color of the damask barrels. In case the damask pattern does not become sufficiently visible, one must rub the barrel with a slurry of chalk or very fine emery, using a linen cloth. Doing so one removes the oxide layer preferentially on the weaker spots of the damask material and the desirable damask patterns appear clearer. As soon as the coloration is strong enough, the barrel is put in boiling water for a very short time in order to neutralize the free acid and to prevent after-rusting. To accelerate the neutralization and to prevent the barrel from being in contact with boiling water too long, which may cause a change in color, one may add soda or an equivalent substitute to the water.

In this case (damask barrels) it is better to neutralize the free acid by dipping in a warm water solution of sodium bicarbonate. The desirable color of the bronzed damask barrel is thus preserved.



As already described, the barrel is then rubbed with wax or alcoholic varnish, in order to provide another light protective coating.

Bronzing solutions suited for damask bronzing are:

a	Antimony trichloride	8 parts (by weight)
	Sulfuric acid	4 parts (by weight)
	Gallic acid	2 parts (by weight)
b	Ferrous sulfate	1.6 gram
	Ferric nitrate solution 28%	5.7 gram
	Ferric chloride solution 29%	9.0 gram
	Distilled water	100 milliliters

Diluted sulfuric acid is used especially in the case of rose damask to etch the barrel in order to accentuate the damask figures. The openings in the barrel are closed securely, to prevent the acid from penetrating the inside of the barrel. Surfaces which should not be treated are coated with lacquer or insulation compound. The barrel is placed in a stoneware or vitrous enamelled trough, containing the dilute sulfuric acid.

The acid attacks soft iron parts of the damask barrel stronger and causes the pattern to show up strongly. After the etching, bronzing can be applied as described above, or the barrel can just be scratched and boiled to neutralize the acid. After this the barrel is oiled or coated with wax or dragon's blood.

Black bronzing (blueing, blackening), using contemporary bronzing solutions, requires that the barrel be completely metallicly clean and be polished well. Only on surfaces free of scale, oil and other dirt can the acid react with the steel and provide the desirable oxide coating. The bronzing solution changes the metal surfaces chemically, and a thin oxide layer is formed. This layer consists mainly of ferro-ferric oxides or mixed cupro-cupric and ferro-ferric oxides, depending on which bronzing solution is used.

The bronzing process takes place in three parts. The first part includes the preparation of the barrel. This includes, as the first step, polishing (buffing) of the barrel in order to obtain a receptive surface, which is a prerequisite for all bronzing processes, including the hand process. The better the metal surface has been polished (buffed), the better will be the color on the finished metal and the resulting bronzing will also be blacker and more durable. Because of the reflection of light in scratches and on rough surfaces, bronzed surfaces may appear as gray and not show a deep black shine. The bronzing process therefore can stand or fall with more or less surface preparation.



The second step is the degreasing. The barrel is first closed at both ends with wooden pegs, to prevent the bronzing solution or water to penetrate the inside of the barrel. The plugs may not be too short, because they have to serve as handles during the bronzing operation and must prevent the hand contacting the barrel. Even the smallest traces of grease or oils which may be found on the hands can make the result of a bronzing operation questionable. During all bronzing procedures, but especially when using the hand procedure, it is imperative that the metal surface stays completely grease and oil free.

Now, after it has been plugged, the outside of the barrel is degreased by rubbing a slurry of chalk, made from precipitated calcium carbonate and water, on the surface and letting it dry. The chalk slurry, while drying, absorbs all traces of oil and fat, and is after drying removed as a dry powder by brushing with a clean brush. The brushing may be done with a hand brush or one may use a rotating wire brush. The rotating brush has the advantage of removing the chalk slurry more intensively, but the dust created in this operation is excessive and care must be taken to have a good dust removal system. It is useful to apply both procedures. First the major part of the slurry is removed by hand, followed by a final cleaning by means of the rotating brush. The cleaning with the rotating brush also results again in a light buffing of the surface of the gun barrel. Boiling with sodium bicarbonate, P3 (Tri sodium phosphate) or equivalent can also be used successfully. Less useful is degreasing with gasoline, because in this case there always remain traces of grease, or grease is even brought back on the surface by the cleaning solution.

(Ed Note: These Cleaning procedures may easily cause you problems. We would suggest you do not try the chalk slurry or the sodium box bicarbonate. For your own sanity don't try gasoline (which leaves a film), or Tri Sodium Phosphate (badly contaminates the surface, affects final color). We do recommend a good safe commercial detergent like Brownells 909 Cleaner.)

Now that the barrel is completely grease and oil free, the second part of the operation, the swabbing and rusting, follows. A sponge or a fine painter's brush is used to provide a layer as thin as possible of the respective bronzing solutions on the surface of the barrel, taking care that no drops remain or no runs are formed. The adhesion of the bronzing layer increases with the thinness of the bronzing solution. It is better to apply the solution once more to the barrel than to put the bronzing solution on too thick.

After the application of the bronzing solution the barrel must be dried, and during the drying process the oxide layer or patina



layer is formed. The drying should possibly take place in a very hot place (not under  $35^{\circ}\text{C}$ ). Since a room temperature of  $35^{\circ}\text{C}$  cannot be achieved, the barrel can suitably be placed in a drying oven which is heated externally. (A suitable drying oven is described extensively at the end of this article.) After the barrel has been dried well, it must rust in order to deepen the oxide layer and to connect the layer with the metal surface. This rusting can also take place in the drying oven. In order to accelerate the rusting process, water can be made to evaporate by putting a dish of water on or above the heat source. By means of the water vapor a strong rust layer is rapidly developed.

After the barrel shows a nice, even brown color caused by the rust, it may be immediately brushed to remove the loose rust. The adhering oxide layer stays behind. Alternately one may boil the barrel for 20 minutes in clean water and thus neutralize the acid. At the same time the already formed brown layer is transformed into a black color.

The loose rust can be easier brushed off after boiling, and the danger that the edges are attacked too strongly and will show bare spots does not exist. Boiling takes place in a simple steel trough, heated with coal, gas or electricity. The barrel is put in the boiling water with the help of brass hooks and must be completely covered. It remains in the boiling water for 15 to 20 minutes. The quality of the patina layer improves with the time of boiling. To boil longer than 25 minutes is, however, uneconomical and usually 15 minutes suffice to obtain a satisfactory color.

In order to deepen the color of the oxide layer, one may add to the last water a sack containing logwood chips or a little bit of extract of logwood. The oxide layer receives a deep black color through the ingredients of the logwood extract. The logwood (Blauholz or Kampeschholz) is won from the center wood of the "*Heematoxylon campecheanum*", which is found in Jamaica, Honduras, Guadalupe, etc. It is commercially sold in the form of chips or as a color extract.

The brushing is done with wire brushes either by hand or by means of a rotating brush. The thickness of the wire must be approximately 0.05 - 0.1 mm. It is much better to use a fine brush, because thick wires attack the edges too much and polish them bare. The rotating brushes should be used with a circumferential speed of 10-15 meters/sec. In case one has a brush of 200 mm. diameter, the speed of the machine should be about 1000 to 1400 revolutions per minute. A faster running brush would show too much polishing effect and would remove the oxide layer again, especially on the edges. The brushing with the rotating brush must



be done very carefully, and one may not in any case push too hard in order to reach spots, such as corners where the brush does not easily touch. In such cases the machine brushing has to be forgone. In order to free these corners and opressions from rust, one subsequently uses the hand brush or fine steel wool to clean up these places. After the barrel is brushed clean, a renewed application of bronzing solution and rusting is carried out as described above, until the desired black color has been achieved. The process, as a rule, must be repeated three to five times.

Once the barrel has obtained the right color, it must receive an after treatment. After the barrel has been brushed for the last time, a thin oil is applied to it. In order to achieve an exceptional shine one may paint the barrel, when it is still warm, with benzoin extract and apply the oil after this. This last coating is not absolutely necessary. It is advantageous to cover the solder seams before oiling with a thin layer of lacquer to make them invisible. This is especially true when the solder seams turned out to be wide.

Usually the color of the barrel will darken after one or two days. Success of the hand bronzing process is almost guaranteed for all processes if the work is done under oil-free conditions. The smallest trace of oil does jeopardize the bronzing operations, and may well be the cause of failure when a particular job does not show the wished for results. A further cause of failure may be run-out from a solder seam which has opened up. At such a spot water is slowly released which was absorbed during boiling. The released water may bring undesirable substances such as oil or grease to the surface. Even water will greatly interfere with the bronzing process. If there is any water on a spot being brushed, brushing will result in the removal of the complete oxide layer and a bare spot will appear. The barrel must therefore always be very well dried before brushing and may not show any moist spots, especially not on the mechanism side of the barrel. If necessary the barrel should be heated over an open flame until all the water has evaporated. It is useful to change the water every time a barrel is boiled because often a thin oil film appears on the surface of the water which will streak the barrel when it is taken out. When this happens the only thing to do is to repeat the degreasing operation.

Bronzing solutions suitable for steel bronzing are:

c	Copper sulfate	1.2	g
	Ferric chloride solution 29%	5.6	g
	Hydrochloric acid	0.5	g
	Ferrous sulfate	4.0	g
	Distilled water	100.0	g



d	Copper sulfate	.4	g
	Ferric chloride solution 29%	23.0	g
	Nitric acid	1.4	g
	Hydrochloric acid	0.4	g
	Distilled water	100.	g
e	Copper sulfate	.36	g
	Ferric chloride solution 29%	20.5	g
	Nitric acid	14.7	g
	Distilled water	100	g
f	Copper sulfate	50.0	g
	Zinc chloride	25.0	g
	Hydrochloric acid		add drops till solution is clear
	Distilled water	1000	g
g	Copper sulfate	50	g
	Ferric chloride solution 29%	300	g
	Mercuric chloride	150	g
	Alcohol	300	g
	Distilled water	200	g
h	Copper sulfate	19	parts
	Nitric acid	5	parts
	Alcohol	9	parts
	Steel filings	1	part
	Distilled water	66	parts
i	Ferric chloride solution 29%	2	parts
	Nitric acid	0.56	parts
	Mercuric chloride	0.56	parts
	Ammonium chloride	0.25	parts
	Distilled water	30	parts
k	Ferric chloride solution 29%	40	parts
	Nitric acid	10	parts
	Mercuric chloride	10	parts
	Calamine tincture	5	parts
	Alcohol	40	parts
	Distilled water	300	parts
l	Ferric chloride	50	g
	Nitric acid	50	g



Mercuric chloride	750	g
Zinc carbonate (neutral)	50	g
Alcohol	50	g
Distilled water	50	g
m Antimony trichloride	2.5	parts
Ferric chloride (crystals)	2.5	parts
Gallic acid	1.25	parts
Distilled water	5.0	parts

By using these shop recipes it is generally possible to achieve satisfactory bronze coatings. Obviously the enumerated recipes are not the only ones, and there are yet approximately 250 others of different varieties. It is, however, too time consuming to enumerate all these, and it would confuse the reader. One of the most difficult jobs is the bronzing of Anti-staining steel barrels, which always offer a great resistance to the bronzing solutions. This is caused by the high alloy content of nickel and chromium, which serves to prevent or minimize corrosion. Unfortunately this will also interfere with rusting during the bronzing process. The use of the drying oven makes it possible, however, to achieve a good bronze also.

The following procedure has been proven to be satisfactory. The barrel is coated with solution n or a proprietary solution after it has been degreased well as usual. After this, the barrel is left in the drying oven to dry and to rust. After it has rusted, the barrel is again immediately coated with the bronzing solution and left in the oven to rust as before. Only after repeated coating with bronze solution are boiling in water and brushing applied. The above sequence must be repeated 4 to 6 times. A further trick consists of adding a small amount of steel etch ink to the solution, which colors the steel fast and allows the oxide layers to darken faster. The steel etch ink can also be added when normal varieties of steel are treated, but, unfortunately, the solution is unstable and decomposes fast. The solution must therefore be prepared daily. It is a matter of trial and error to find out which solution and which addition compound are best suited, since the conditions differ from shop to shop.

An anti-staining steel barrel showing a gray or brown coating indicates that the rust was not sufficiently removed.

In many cases a strong brushing, until the oxide layer clearly appears, will help. In cases where this does not provide any help, the only thing to do is to polish the barrel and repeat the whole bronzing process.



A bronzing solution suitable for anti-staining steel barrels is:

n	Mercuric chloride	0.35	g
	Copper sulfate	0.4	g
	Ferric chloride solution 29%	23.0	g
	Ferric nitrate solution 28%	24.0	g
	Nitric acid	3.5	g
	Distilled water	100	g

It may not be economical to heat up an immersion bronzing bath for just a few small parts; in this case the parts are wetted with linseed oil and placed in a heated container of iron or steel sheet. The container must not be so hot as to glow. As soon as the parts begin to smoke they are taken from the fire and well shaken. The heating and shaking is repeated until the desired color is obtained. Larger parts can be carefully heated on a charcoal fire until they show a blue oxide color and then are painted with bone oil. The heating and painting are repeated until the desired color is obtained.

The well degreased parts may be dipped in a solution, or painted with a solution of the following composition:

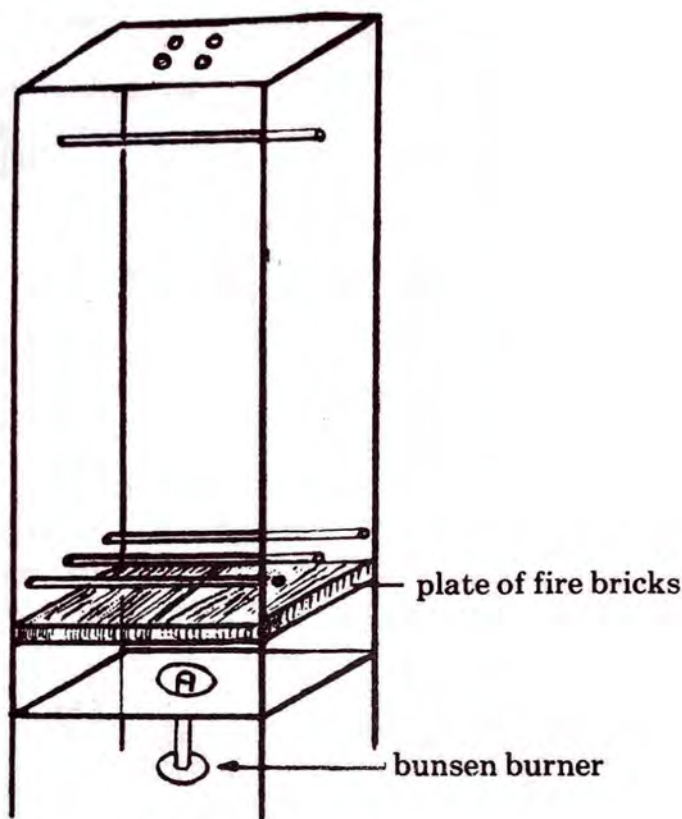
o	Bismuth chloride	1 part by weight
	Mercuric chloride	2 parts by weight
	Copper chloride	1 part by weight
	Hydrochloric acid	6 parts by weight
	Alcohol (methyl)	5 parts by weight
	Distilled water	50 parts by weight

After the immersion the parts are dried and put in boiling water for about 30 minutes. In case the color is still too light, the procedure is repeated until the color is right.

The drying oven for fast drying and rusting of the barrels can be manufactured in the shop itself from angle iron and steel sheet. The angle iron box which measures 25 x 25 cm. with a height metric of approximately 120 cm. has a welded or riveted horizontal frame at the top and near the bottom. The lower frame is built about 15 cm. from the ground, with the result that four legs are formed. The frame is covered on the outside with sheet steel and on the front a door is put in with simple hinges and a lock. The sheet of steel which was put on the bottom frame of the furnace has a hole in the center with a diameter of about 6 cm, where a small bunsen burner can be placed to provide the necessary heat. Above this hole a layer of fire brick is placed at a height of about



10 cm. to prevent the flame of the bunsen burner to hit the barrels directly. A few centimeters above this one can install another rest



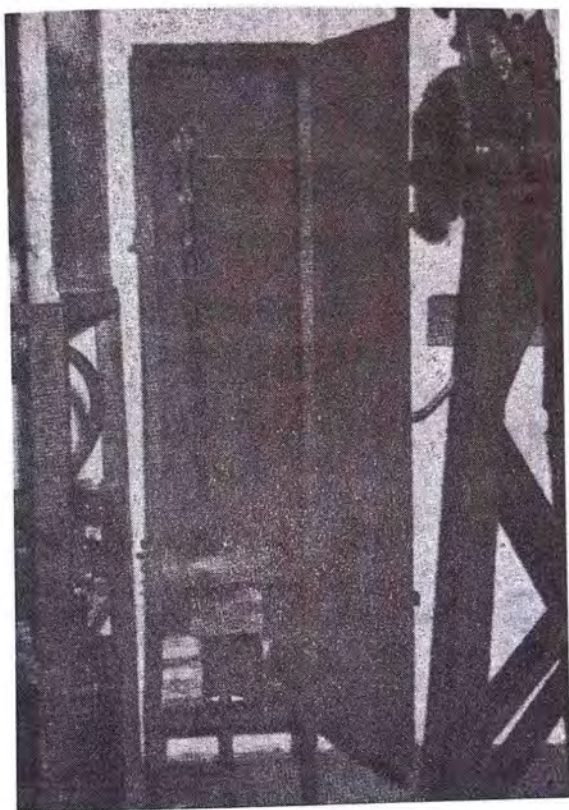
Cut-away sketch of inside of drying oven.

by simply putting a few steel rods through holes in the side of the oven and covering them with a piece of fine wire screen. The wire screen prevents flames, which have bypassed the fire bricks to reach the drying compartment. About 14 cm. from the top of the oven a steel rod is put through holes in the side walls to serve as a support from which the barrels are suspended with hooks. The top cover contains also a few small holes which have the purpose of letting the water vapor escape. In this way the flow of water vapor around the barrels is homogeneous and pressure build-up in the oven is prevented. By putting a steel sheet on the top of the oven one may regulate the flow of water vapor in case the flow is too fast.

The cabinet can also be constructed in horizontal fashion and the barrels are then rested on two steel rods. The heating is then logically achieved from the bottom.



The drying oven is used to dry the barrels for about 10 minutes, while regulating the flame of the bunsen burner in such a way that the temperature does not increase too much (35 - 60° Centigrade). The time is best controlled by the use of a timer which can be set for a certain time and rings after the time has elapsed. After 10 minutes a container with water is put over the



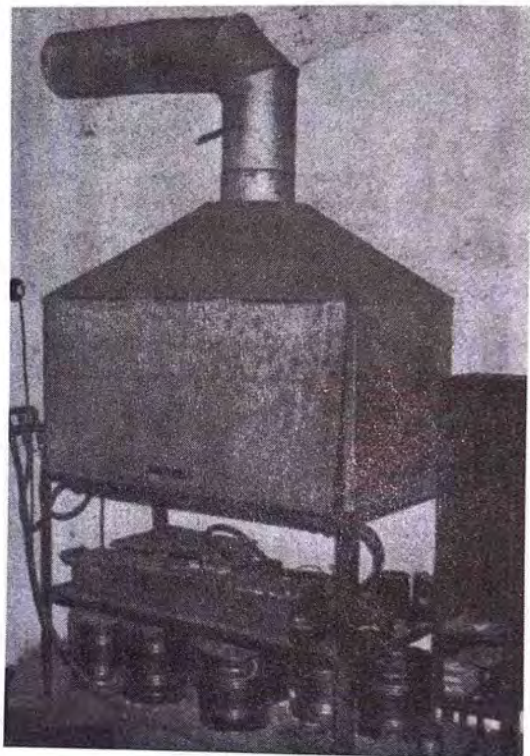
burner to create flow of water vapor. The barrel is left for 15 minutes in the vapor stream. At this time the flame is put out, and the barrel stays in the oven until the water needed for boiling of the barrels starts to bubble. Then the barrel is placed in the boiling water and treated as described before. After brushing, treatment with the bronzing solution and oven is repeated. In this oven the rusting process occurs very fast and it is generally possible to repeat the operation, including the side activities, five times in one day, which is sufficient to obtain a satisfactory deep black color.

It has been shown to be advantageous to degrease the barrel and to treat it once with the bronzing solution the night before and then let the barrel stand overnight. The next morning, in case the rusting has not progressed far enough, one can proceed with the



drying oven as described before. This oven can also be used to achieve the smoking effect described at the beginning of this article. The burner may be allowed to burn with a sooty flame in order to produce the necessary smoky deposit.

In smaller shops the question of space is always a problem, since the water vapor produced by the boiling operation acts upon the tools and machines. In such a case, a simple boiling installation as shown in the picture will help.

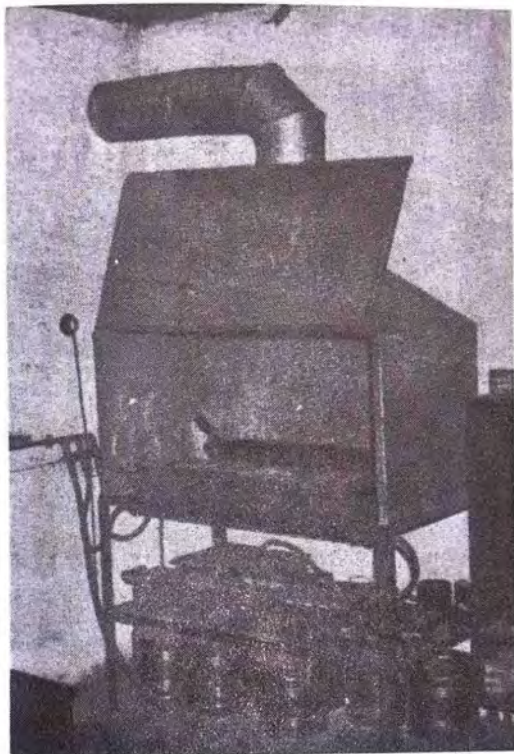


The installation consists of a table made out of angle iron (about 120 x 65 cm). Angle iron frames are welded along the longitudinal direction to support the various bronzing baths. This way the bath is always situated directly over the flame and is secured against movement. Two pipe burners, which work on the principle of the bunsen burner, are placed under the frame. The front burner may be made up out of two smaller pipes, which, used together, can heat a big kettle or, used separately, can heat two smaller kettles for small parts.

The table is about 80 cm. high and at the height of 45 cm. a second steel frame is constructed, which is covered with steel



sheet. On this "table" one can store the kettles and containers which are not presently needed but keep them handy for use.

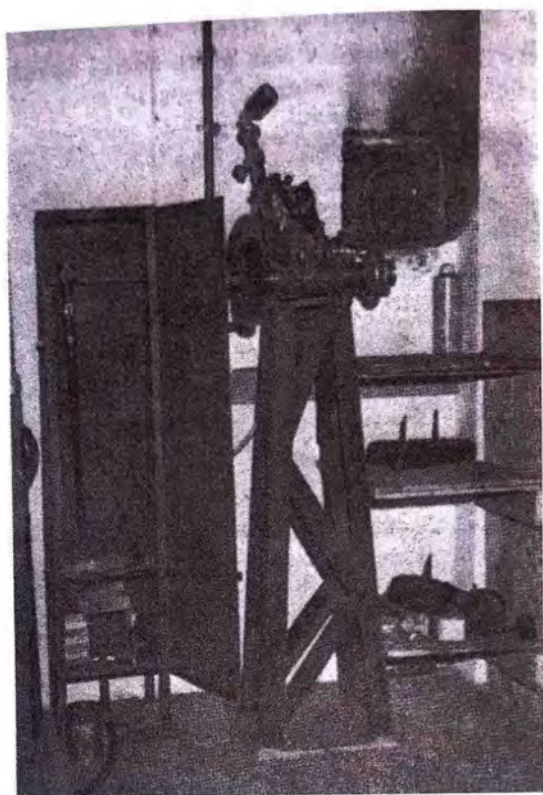


The necessary chemicals may be stored under the table. This installation can be used in combination for boiling and dipping and requires very little room.

A hood made out of sheet steel is installed over the table to remove the water vapors present. At the top, the hood is provided with a duct (20 cm. diameter) which is led through a wall to the outside. The duct can be closed with a damper to prevent cold air from entering when the installation is not in use. On the inside of the hood is mounted a watertight electrical light fixture to provide the necessary light. Besides the bronzing table the picture shows also the drying oven and a scratch machine. By using this installation it is possible even in small shops to execute the activities connected with the bronzing process in a fast and clean manner; vapor will not be detectable, and no special workroom is necessary.

The scratch machine pictured below and provided with a fast changeable spindle is recommended. This machine makes it possible to work with brushes or grinding discs without having to





resort to extensive changeovers. The tools simply screw out and in. Since the grinding operations require a higher r.p.m. the V belt drive mechanism must be variable and must have two drive discs. It is furthermore very much recommended to install a backstand arm which makes it possible to work with grinding belts. These grinding belts serve the gunmaker very advantageously and allow work to be done which can hardly be achieved with grinding discs.

The grinding belts can also be ordered from this firm and have the advantage that with one disc different grain sizes can be used. This is extremely important when one has to operate with a profiled disc. One has only to produce the profile in the disc once and then the different grinding belts can be put over the same disc; rough and fine grinding and final buffing require only changing of the respective belts. When the belt goes dead, it is simply thrown out and a new one is put on. The difficulty of dressing the grinding discs is omitted.

- by R. Triebel, Kaufbeuren, *Der Buchsenmacher*, April 1959, Number 4.



# **ELECTROLESS NICKEL PLATING INSTRUCTIONS & EQUIPMENT**

by  
**Ralph Walker**  
and the Crew at Brownells

An easily applied, beautiful, durable, attractive, long-wearing and non-rusting finish for metal gun parts has long been sought by the firearms industry. Nickel plating has been one of the favorite plated finishes, meeting all of these requirements except the first one - "easily applied" - until now. Now, we can finally offer you a simple to do, easy to apply, absolutely fool-proof nickel plating system for the individual gun shop that will give you a beautiful, uniform, evenly-plated, ready-for-assembly finish of the exact thickness you want each time you use it. And you can do it yourself in your own shop using safe-to-handle chemicals with a minimum of extra equipment.

In order to understand the real impact and importance to the gun shop of this new nickel plating system, however, we need a short history lesson on nickel plating.

Traditionally, nickel plating was applied by a process called "Electroplating" which used an electric current to deposit the nickel onto the steel surface. To work, the steel part to be plated was suspended in a solution containing a high concentration of nickel along with a bar or sheet of pure nickel. The negative wire from the power source was connected to the steel part (making it the cathode) and the positive wire was connected to the nickel bar (making it the anode). By carefully controlling the D.C. electrical current passing through the anode into the solution and on through the steel part, the nickel in the solution was deposited on the steel. At the same time, an equal amount of nickel was being removed from the nickel bar to replenish that which was taken out of solution.

The electroplating system works and is still being used; however, it has some serious drawbacks. Because electricity by its very nature takes the path of least resistance, the edges of the steel part being plated receive the largest deposit of nickel, the flat surfaces a thinner plate and recesses or crevices received even a thinner plate—and in some instances, no plate at all. Also, the chemicals involved almost always are forms of metallic cyanide salts solutions, which, besides being deadly poisonous in the presence of any acid solution, can be shipped only by truck freight (not by UPS, Parcel Post or any Air Freight/Mail method). This makes getting the supplies to the operator slow and often outra-



geously expensive. Finally, the plate thrown in an electroplating system is characteristically rough. Often pieces have to be pulled out, wire brushed to "reactivate" the surface and put back into the plating bath. Then, the final finish is so rough that extensive polish has to be done to bring the gun up to the expected "bright" standards of nickel plating.

Fortunately, about 1945 a method of depositing nickel on the surface of the steel was discovered that did not require electricity, but used chemical action to do the work of the anode, cathode and cyanide salts solutions. Because of intense industrial interest in the success of the process, it has been developed to the point now that almost universally perfect results can be achieved by the most fainthearted beginner as long as he mixes the solutions correctly and follows the steps exactly. In addition, this new process, called "Electroless Nickel Plating" will deposit an absolutely uniform plate thickness over the entire piece smoothly and beautifully using chemicals that are readily shipped by United Parcel Service. The equipment needed is minimal - a couple of plastic pans, an old sink, a heat source, a couple of Grandma's blue-rock canners and a stirring mechanism. Plus the patience - and intelligence - to read and follow the instructions, particularly the cleaning instructions, to the letter.

The efforts expended in learning this new process - and doing it on your customer's guns - is going to be one of the most rewarding experiences you can have in your shop. The pieces come out of the plating bath diamond-bright and beautiful - ready to dry off and wipe down with a jeweler's cloth and assemble. If your customer prefers a Satin Nickel Finish (requiring light sand blasting or glass beading before plating) the finish is outstanding, and has more appeal than even stainless steel because it looks so nice. But, let's get down to some hard and fast specific advantages of the Brownell Electroless Nickel Plating System... things to hang your hat on and things to sell your customer on:

- 1) Outstanding resistance to continuous exposure to fingerprints, petroleum distillates of all types, gun solvents, gun cleaners and all powder residues.
- 2) A salt spray corrosive resistance tolerance exceeding 240 continuous hours per 1-mil thick deposit.
- 3) Yield of nickel plate deposit is absolutely predictable, letting you put exactly the amount of nickel plate on the piece that you want to.
- 4) None of the chemicals or processes used involve the use of cyanides or any of the cyanide compounds common to all Electroplating. As a result all the chemicals can



be shipped by UPS - the fastest, cheapest and most convenient common carrier available. Also, without the use of cyanide compounds, nearly all the health hazards usually associated with Electroplating have been removed too.

- 5) All surfaces submerged in the plating solution are equally plated with a micro-smooth nickel deposit of microscopically uniform thickness. This adds a natural low friction and lubricity which results in easier gun operation than with normal unplated steel.
- 6) 0.1 tougher than hard chrome on the Taber Wear Index, and although this does not seem like much, the index is a logrhythmic scale, meaning that it is truly significantly harder.
- 7) Expansion and contraction from heat does not result in cracks and peeling of the nickel plate as is common in other forms of plating.
- 8) Will pass a 180° bend test without cracking or peeling.
- 9) It is rated at Rockwell C 53-56 in hardness as it comes out of the plating tank! This means that the simple plating of a wear surface alone will greatly extend its useful life.
- 10) The plated surfaces can be soldered, brazed or welded.
- 11) The Nickel plate is non-magnetic and will not affect the magnetic or non-magnetic qualities of the surfaces it is applied to.

And, if that is not enough, because nickel plating prevents rust, you can plate bullet molds (gives smoother bullet dropout too) or other shop tools, fixtures or jigs. And, when plating pistols, the plated bore reduces leading making it easier to clean. (Since the plated surface is quite hard, however, best do all repair work before plating. It's almost impossible to do a throater job on a revolver after it is plated!) Likewise, because you have complete control over the thickness of the plate you can put on as much or as little as you wish. If you should get a little too thick a plate, simply polish off a small amount until you get the fit you want. You can even build up undersized parts, although one-mil plate per piece should be considered maximum. Actually, *three-eighths-mil thickness is considered overall the best combination of long wear and durability for gun plating.*

Since all electroless nickel plating systems use a nickel alloy as the plating metal, different alloy solutions are required for different applications and for different base metals. The Brownell Electroless Nickel Plating System deposits an alloy consisting of



87% per nickel, 12% phosphorous and 1% copper, and has been carefully formulated to meet the requirements of firearms - including mild steel, alloy steel, cast iron, cast steel, and so on. Also, with slight modification to the cleaning and pickling solutions and the use of a special activator, brass and other copper-bearing-alloys can be very successfully plated too. For the time being, plating of aluminum is not being done satisfactorily, nor, will stainless steel plate properly without additional chemical preparations. So, please do not attempt to plate these metals as the results are not predictable and may be disappointing.

The solution and system of application are the results of several years of testing under all kinds of laboratory, industrial and gun shop conditions. We know you are going to be as pleased and delighted with the extraordinary results you will be able to get as we are with being able to provide such a fool-proof Electroless Nickel Plating system to you.

### Safety

Every effort possible has been taken to make the process as safe to use as possible. Common sense must be applied when using any chemical process. **READ THE WARNINGS ON THE CONTAINERS.** The plating room must be properly ventilated. An exhaust fan, similar to the ones used above a large kitchen stove is easily installed above the plating tanks. Be sure a window or door is left open for fresh air intake. The operator must wear long-sleeved clothing, a filter mask, a full face shield, a neoprene work apron and rubber gloves. In short, use the same personal protection equipment as in bluing. Use extreme caution in handling acids, plating and cleaning solutions. Do not use or store chemicals near food or in a food preparation area. Wash down all exposed surfaces with a flood of clean water.

This instruction booklet is based on our working experience and to the best of our knowledge is true and accurate. However, since the conditions for use and operation in your shop are beyond our control, this information and these products are offered without warranty or guarantee as to use or safety.

#### USE EXTREME CAUTION:

There is no such thing as being too safe in handling all types of chemicals!

### TANKS AND SOLUTIONS

**PLATING AREA** - If you have a separate bluing room or area, this is the ideal place to do your plating. If not, a specific isolated area should be selected with two factors in mind. First is safety.



As you are dealing with acids and potentially hazardous chemicals, care must be taken to prevent unauthorized personnel from entering the area and being accidentally injured. "DANGER - ACIDS" signs in the area are a good idea. Second, the area must be as free of air-borne contamination as possible. (Such as polishing dust, sanding dust, etc.)

**HOT CLEANER TANK** - The hot cleaner tank normally used with a bluing operation can be utilized to decrease the number of tanks you have to get. However, as cleanliness is a major factor in all plating, the best arrangement is a separate cleaning tank to be used only for plating. The common *misconception* that "the cheap way is best" holds true here too. Only one gun requiring stripping of the poor plating, re-polishing, and re-nickeling will exceed the cost of setting up of a separate hot cleaner tank for use daily in plating. The Brownell 6" x 6" x 40" Bluing Tank and Pipe Burner (specify natural or bottled gas) is fully adequate. If you don't want such a large hot cleaner tank, an excellent one can easily be made from another of the porcelain tanks (described in detail under the "Plating Tank" section), heated by an electric hot plate or the special Brownell Gas Ring.

Do not attempt to keep the cleaner solution from plating day to plating day. In fact, since a clean surface is so vitally important to good nickel plating, we suggest you change it oftener if you are doing more than 6 - 8 guns per day. When not in use, cover the empty hot cleaner tank with a section of  $\frac{1}{4}$ " plywood over a couple of layers of 6-mil builders plastic to keep air-borne particles from contaminating the interior of the tank.

**FLOWING WATER TANK** - This tank can be any container large enough to hold the guns. It can be metal, rubber, plastic or ceramic. (Any time a "Flowing Water Tank" is used in these instructions, it is this same tank.) You only have to set up one Flowing Water Tank because the constantly changing water keeps it clean between steps.

The tank is set in an old sink - available at most salvage yards - and the sink equipped with a drain pipe and cold water faucet. A section of plastic pipe or hose with several holes in one end is placed on the bottom inside the tank. The other end is connected to the faucet. As water flows through the pipe and out the holes, clean fresh water is brought into the bottom of the tank which pushes the old water upward over the sides of the tank into the sink and down the drain. In doing so, all residue is flushed out of the tank assuring a continuous and adequate supply of clean fresh-flowing water.

Make sure that the flowing water tank sits level in the sink so



that the water flows evenly over the top edge - all around the top edge. This prevents "dead spots" in the tank which could still contain chemicals from the previous wash and contaminate your plate job. Be sure to use a "medium" or heavier water flow to keep the tank clean. This is imperative! If the parts are not thoroughly rinsed and all traces of the 909 cleaner removed (which are alkali) they will be dragged out into the pickling or plating baths (which are acid) and partially neutralize or "kill" them. Likewise, the acid pickling bath must also be thoroughly rinsed off so as not to carry over into the plating bath and upset the chemical balance there. Always flush the tank for two or three minutes prior to starting a plating session. Drain the tank occasionally and washout thoroughly with common dishwashing detergent.

**PICKLING TANK** - This tank cannot be metal of any type, not even stainless steel! Rubber, plastic, ceramic or glass tanks must be used. A simple, inexpensive and efficient pickling tank can be purchased at most discount, grocery or hardware stores. **RUBBERMAID** makes a variety of excellent plastic containers which are highly acid resistant. We found we like using a small gallon-size, heavy-duty wastebasket for the pickling tank because it gave us lots of working depth in the tank for a relatively small amount of solution. For safety sake, we put the wastebasket inside a medium-sized deep-sided heavy-duty plastic dishpan, so if we had an accident or a leak we wouldn't have acid all over the plating room. When not in use, you can either store the acid in brown plastic chemical jugs (our preference), or leave the pickling solution in the tank, covering it with either a piece of glass or plexiglass to keep it uncontaminated. This tank is not heated, and if emptied, must be flushed thoroughly several times with clear water to eliminate all possible chance of accident with the acid residue.

### Plating Tanks

This tank should be an extremely fine-surfaced ceramic, porcelain, pyrex, or one of the new heat-resistant plastics like high temperature polypropylene, polyethylene or gel-coated fiberglass. (Stainless steel can be used but it first must be "passified", a technique we describe later.) Because a heat source must be used to operate the plating solution at 195° F., the plastic and fiberglass tanks require quartz immersion heaters which are quite expensive. So, although there are several tanks that could be used, the limitations of the materials and the heat source make some of them both complex and expensive. Therefore, for the sake of these instructions, we are going to discuss only the following two tank systems: One system uses a porcelain enameled steel tank, gas heat and me-



chanical agitation. The other uses a pyrex glass gallon tank and an electric Hot/Stir Plate which gives both electric heating and magnetically-coupled agitation all in the same unit. We found specific advantages unique to each system, and applications where one was superior to the other. So, we've described each in detail below so you can choose the one - or quite probably either - that will work best under your shop situation.

### (A) Porcelain Tank Gas Heated - Mechanical Agitation

This is an extremely flexible and economical system to construct and use. With three sizes of porcelain tanks available you can do just about any big or small plating job. The largest tank will take up to 4 handguns, while the smallest will handle 1 small one, or a number of individual small parts. However, the porcelain tank is slightly porous which will slowly build up a light plated surface inside the tank, especially on the bottom. When this plate gets heavy, the tank must be discarded and a new one purchased. Since the price of the tank is modest and its use life fairly long, this is not a major expense.

The **PORCELAIN TANK** is nothing more than a common kitchen canning boiler available at most hardware stores. We discovered that these are a highly seasonal item in most areas, so we have stocked 3 sizes in case you have difficulty finding the size you want in your local area.

The **HEAT SOURCE** is a special Gas Ring with mixing chamber and valve, (specify Bottle or Natural Gas) plus mounting pedestal. Temperature is controlled by adjusting the gas valve. An electric hot plate can be used, but when heating up the larger tanks, the time delay is a disadvantage, and most hot plates designed for the home-use market just don't have the heat output to even heat up the larger tank. The stand to hold the plating tank needs to be built around your heat source, and ideally will be about waist high (or can be short and put on a bench). Across the top of the stand, weld  $\frac{1}{4}$ " rods about 2 inches apart to support the plating tank. Remember, you probably will be using more than just one size tank, so best take into account how you are going to support the larger and/or smaller tanks over your gas flame. We found a rectangular barbecue grill and some bricks work well - as does an equilateral triangle made out of 1" angle stock using red-iron rods and nuts at the corners to hold the sides together and support the stand above the gas ring. Just keep the stand sturdy and convenient to work around.

We mounted our gas ring on a 1"x3" board about 20" long for



easy centering under the plating tank, pulling out for lighting, bench clean up and so on. Base flange takes a standard  $\frac{1}{2}$ " pipe nipple, so you can easily raise or lower the whole gas ring assembly by changing nipple lengths. You must use a heat diffuser plate between the gas flame and the bottom of the plating tank. We found that a steel or aluminum plate about  $\frac{1}{4}$  to  $\frac{3}{8}$ " thick and about 2" larger than the overall diameter of the tank you are using to be ideal. (If you do not use this diffuser plate, you stand a very good chance of overheating the plating bath directly above the flame and causing the nickel to literally "fall out" onto the bottom of the tank. If the gas ring is used, this "fall out" will frequently be in a "donut" shape, coinciding with the round shape of the gas ring directly below the tank.) When properly set up, the hottest part of the gas flame should just be touching and spreading out across the bottom of the diffuser plate it is under. (The hottest part of the flame is that section directly above the inner "blue" cone that you can see, and is usually not readily visible.) We found we had about  $1\frac{1}{8}$ " from the top of the gas ring to the bottom of the diffuser plate. You may have to adjust yours from that to compensate for altitude, gas type and/or pressure, etc. Then, set the porcelain enamel pan directly on the diffuser plate for best heat conduction.

The **MECHANICAL AGITATOR** is a small 110 Volt 1/40 h.p. sealed kitchen ventilator motor. A paint stirrer made to use with an electric hand drill is connected to the motor shaft with a coupling. In use the paddles on the stirrer cause the plating solution to swirl around in the plating tank. This agitation must be a steady movement of the plating solution to assure a constant and continuous supply of fresh solution past the metal surfaces being plated. If the swirling motion is too fast and excessive "whirlpooling" is caused, oxygen and air bubbles will be carried into the solution and will "crater" your plated surface, requiring that you strip and replating the part. Ideally, the agitation should be fast enough to create a "cone" in the center of the bath, about 1" deep once the parts are in it, but, never enough to cause air and bubbles to be drawn down into the bath. You will be able to see this condition easily; there will be a string of bubbles trailing down from the cone when agitation gets excessive. The easiest way to stop the over-agitation is to move the stirrer to a different location in the tank. If this doesn't do it, then you can shorten the paddles on the stirrer itself, or use a speed control on the electric motor. We found the sealed Stirrer Motor cataloged caused whirlpooling in the smaller tanks. Sometimes placement of the parts being plated would break it up - if not, we used the Dremel Speed Control to



slow down the motor. Note, however, that insufficient agitation will cause poor plating just as much as over-agitation will; so watch this carefully and be sure to have at least the 1" cone in the center of your operating bath. We found we had to put a lightweight sheet metal heat shield between the motor and the heat coming up around the side of the tank in order to keep the motor from overheating and burning out. It was a simple bent-up affair, but did save our motor. Watch for the condition and prevent it.

Obviously, some form of support bracket must be used to hold the agitator. This is easily made from a section of flat  $\frac{1}{4}$ " x 2" common iron, 24 inches long. Note that the electric motor has two mounting screws on each side of the shaft. At one end of the steel or iron flat, locate the exact center about  $2\frac{1}{2}$ " in from the end and drill a hole large enough for the motor shaft to pass through. Now, locate and drill the two holes for the mounting screws. (The motor shaft hole should be slightly oversize, the mounting screw holes the diameter of the bolts.) Install the motor temporarily, tightening the nuts and check to be sure that the motor is running free. Then remove the motor. At the same end of the flat stock, measure off and mark a line 6" from the end - which puts the line 3 to  $3\frac{1}{2}$ " from the shaft hole. Heat the iron right on this line and make a 90° bend in the shape of the capital letter "L". The long leg of the support bracket is not welded to the stand. Instead, with motor, agitator paddles, etc., installed, a "C" clamp is used to attach the agitator support to the stand holding the plating tank. This allows you to reposition and adjust the agitator as desired in relation to the plating tank.

The paddles of the mechanical agitator may become plated when used in the plating solution, but is is a slow build up. The same agitator can be used in the nickel stripping tank, which will, of course, remove any plating buildup on the paddles and shaft.

### (B) Pyrex Tank Electric Hot/Stir Plate

The beauty of this system is its compactness, ease of use and set-up, plus positive and immediate control over agitation rate. It also permits easy stripping of parts where the solution must be used in pyrex, ceramic or other non-metal containers.

The PYREX TANK is a large laboratory jar which will give long useful life if handled with common sense and care. In use, it is filled with solution and placed in the center of the heat table. (Do not heat it empty then pour in solution - that causes thermal shock and will break it.) Turn the heat up to maximum setting, start the agitation and let the temperature of the solution come up to oper-



ating level before turning down the heat control. Pyrex cannot be used over direct gas flame, directly on "kitchen-variety" hot plates or other heat sources; the thermal shock will break it. Also, any sudden change in temperature from hot to cold or vice-versa will cause thermal shock too. Once you are finished with the solution in the pyrex tank, turn off the heat, and let the tank with the solution still in it remain on the Hot/Stir Plate until cooled down to room temperature.

The **ELECTRIC HOT/STIR PLATE** is simplicity itself to operate. Once the filled pyrex tank is placed in the center of the heat table, one of the small teflon-coated stir bars is dropped into the tank and the *Stir* dial turned slowly until the drive magnet under the heat table "couples" with the stir rod and starts it turning. For more agitation, just continue turning the dial. At some point you will stir faster than the rod can move through the solution and the stir rod will "throw-out" on you. Then just back off the stir knob setting until it is slow enough to again couple with the rod and you can bring the stirring back up to best speed. (This magnetic agitation system will not work through a steel container, so unfortunately, you cannot use it with the porcelain tanks. However, if you are using a flat-bottomed 304 or 316 stainless steel tank for stripping, it works quite well. Note: you must never try to plate in a stainless steel tank without first passivating it per the instructions on page 242.) The Heat control dial is marked with relative graduations, and should not be taken for temperature settings. The heat table itself is a very heavy aluminum casting with embedded heating elements. When heating a one-gallon solution in a pyrex jar we found we had about a one-degree rise of solution temperature per minute of heating time. However, to control the heat loss through the pyrex, we found we had to put a "jacket" of aluminum foil or fiberglass insulation around the pyrex container, and a plate glass or wood lid on the top. You can easily have up to a 20% heat loss without the lid and jacket. and in some cooler plating rooms, you may never be able to bring the solution up to the proper plating temperature.

**THERMOMETER** - You must use an accurate thermometer with either tank/heat source system. We recommend the Brownell Bluing Thermometer or a good quality Laboratory Thermometer to assure exact temperature. Do not use an alcohol-filled cooking or kitchen thermometer, and most meat thermometers are simply not accurate enough. Since temperature control is critical, don't guess on the temperature of your solutions - **USE THE THERMOMETER, and USE IT OFTEN!**

**DIP STICK** - As you read further through the mixing instruc-



tions of several of the solutions you will discover that you mix the measured amounts of chemicals and then "add water to bring to 1 gallon". This means you must pre-determine the capacity of the tanks you are going to use - and you must be able to tell how much more water is needed to top them off. We found that by pouring measured gallons of water into each new tank before we used it and measuring the depth of the solution in the center of the tank with a dip stick, and recording that depth either on the stick or in a log, we could then mix the solutions accurately with ease. Actually, we found a stainless steel rule the easiest to use, for you have to only record the number of inches per gallon in each of the different tanks and then can use that base figure to mix solutions of gallons, parts of gallons or multiple gallons, checking total volume with the rule. Sorta like going to the gas station and ordering up "7½ inches" of gasoline!

### Water Quality

Water quality is extremely critical in plating. If the water you use in the rinse tank has an excessively high iron, magnesium or metallic-ion content, the dragout from the flowing water rinse tank into the plating tank may well be sufficient to "kill" the plating solution. (The nickel is so anxious to attach itself to some metal that it is just as likely to plate the iron or magnesium molecules or other metallic-ions in the solution as it is to plate the gun suspended in the tank. These plated molecules fall out of the solution and collect on the bottom like sand. In some cases, the nickel even appears to "plate" a Pyrex container because the metallic-ions in the water cause it to "fall out" and adhere to the Pyrex.) If you have this problem, you will have serious problems plating successfully. Therefore, we insist that all plating, stripping and pickling solutions be mixed with distilled water rather than local tap or well water. This is very important and despite how safe and clean you think your water is, don't chance your plating solution's life on it.

Secondly, if you suspect high iron in your water, you can put the parts through a 1,1,1 Trichloroethane dip just prior to going into the plating bath, after the flowing water rinse tank. This will remove the water from the metal's surface and prevent "drag-in" of the water to your plating bath. We realize this sounds like a very small matter . . . a little iron in the water . . . but, it can easily use up all the nickel in your bath. Worse, it will mix with the nickel that is plating the surface of the gun and actually be entrapped there to "rust" later, after the gun has been returned to the customer. We have had several reports of this from gunshops in areas where there is a high iron concentration in the water. Be



very careful that it doesn't happen to you! Always suspect your water as the prime contaminant source for the plating solution.

## NICKEL PLATING STEEL

### Technical Information On Mixing & Using The Pickling Solution For Nickel Plating Steel

**A NOTE ON ACIDS:** The Hydrochloric Acid (HCL) furnished by Brownells is a 31% pure concentrate. This is equivalent to an 18° Baumé Muriatic Acid (HCL). Either acid can be used in the mixing of the pickling solution as they are both exactly the same chemically. (In fact, our supplier may label the jugs either Hydrochloric or Muriatic; you can use either or mix them together as they are the same.) However, Hydrochloric Acid is available in concentrations as high as 37.3% with a specific gravity of 1.18 and is equivalent to 23° Baumé Muriatic Acid. This concentration is too strong; do not buy or use it, for it may result in damage to the gun.

#### TO MIX ONE GALLON OF PICKLING SOLUTION:

(Do these steps exactly in the sequence given!)

- a) Measure the capacity of your container and mark a permanent line at the one-gallon level on the outside of the tank.
- b) Pre-measure 1.5 pounds by dry weight of Activator Additive C-1.
- c) Measure two (2) quarts (64 fluid ounces) of distilled water and pour into the tank. (Remember, this must not be a metal tank!)
- d) Add the pre-measured 1.5 pounds of Activator Additive C-1 slowly to the water in the tank, stirring with a clean plastic or nylon spoon until the C-1 is totally dissolved in the water. You will have a solution that has a "head" of suds on it just like a pan of dishwasher. This is normal.
- e) Very slowly add 51 fluid ounces of Brownells Hydrochloric Acid to the solution. Stir thoroughly.
- f) Bring the volume of the total solution to the one gallon mark you made on the tank by adding additional distilled water slowly. Again, stir thoroughly.

The Pickling "Activator" Solution is now ready for use. This tank is not heated but is used at room temperature. The solution may remain in the tank when not in use, but it must be covered to avoid air-borne particles from contaminating it.

- (2) Be sure you control the amount of time gun parts remain in



the pickling solution. Do not leave a part in the solution in excess of one minute as solution will begin to etch metal. If a part is dropped into the solution, do not remove by hand - use a magnet on a wire or rod to remove the part. *It is recommended that a new solution be made up after approximately twelve (12) average size guns have been through the tank to assure correct function.*

(3) When immersed, the parts will start to bubble or "gas". This is normal and indicates that the solution is functioning correctly. If no "gassing" is present, the solution is probably too weak for correct operation and should be replaced. However, if you are plating either high carbon steels or case hardened steels our experience indicates that you will have to keep these parts in the pickling solution for as much as 15 or 20 seconds before they will start to "gas" satisfactorily. You may even find that on parts like Ruger cylinders, Smith & Wesson magazines and a number of .45 slides, that you have to dip the part into straight acid for two or three seconds to get it started "gassing". This is an extreme method, and should not be used on any parts but those that won't gas in the normal pickling solution. Once "gassing" has started, remove the parts from the pure acid and immediately immerse in the flowing water tank. Then, put them into the pickling solution for the normally allotted time. You must have this uniform "gassing" of the metal surface for the nickel plating to "strike" (stick-on) properly, so watch carefully and be sure you get it.

(4) The C-1 additives' purpose is to prevent "smut" from forming on the metal. If this occurs, use a clean cotton swab to remove the smut. Normally, it will not occur but if smutting persists, the solution is out of balance and must be dumped and a fresh solution made. Wash tank thoroughly in clean water each time an old solution is dumped.

### Technical Information On Mixing & Using The Hot Cleaning Bath For Nickel Plating Steel

(1) Determine the size tank you wish to use and the volume of solution it will conveniently hold in gallons (ie: 1-gal, 1½-gal, 2¾-gal, etc.).

#### TO MIX ONE GALLON HOT CLEANING SOLUTION:

- a) Mix 8 oz. by weight (approximately 1 cup by volume) of Brownells Dicro-Clean 909 per gallon of clean water.
- b) Heat to 180° F. and stabilize temperature.
- c) Suspend parts in the cleaning bath for 10 to 15 minutes.

If you already have a bluing tank setup, the same tank can be used, but be sure to change the solution mix to this ratio, not the milder cleaning ratio used for cleaning prior to bluing.



### Technical Information On Mixing & Using The Plating Solution For Nickel Plating Steel

(1) The plating tank, agitator and measuring containers should be thoroughly washed with clean fresh water just prior to each time the tank and accessories are used. This removes dust and other contamination that can ruin a plating solution. (See Water Quality on page 229.) **DO NOT SKIP THIS STEP!**

(2) Always measure water and solutions. Guessing results in a solution too weak or too strong. Use one non-metallic measuring cup for the plating solution. A different one for the pickling solution, etc. Trying to use one measuring cup for all solutions will result in chemical contamination and a ruined solution. Measuring cups are inexpensive, so do not try to cut corners. Mark each with felt pen or regular fingernail polish as to its purpose.

(3) Plating solution operating temperature range is 190° (minimum)-to-200° (maximum) **Fahrenheit**. For best results try to maintain exactly 195° **FAHRENHEIT**. Operating exactly at 195° will give you exact plating thickness control.

(4) At correct operating temperature, the plate deposit is controlled by the length of time the part is in the solution. **One Hour Will Give A Half-Mil Plate** ("mil" is .001 inch, so a half-mil plate is .0005 inch thickness). This is maximum for firearms as a thicker plate will probably cause problems in re-assembly. One half hour immersion in the solution will give a quarter-mil plate (.00025 inch) which is adequate with good wear results, and no problems with re-assembly. However, a quarter-mil plate should be considered minimum for firearms. We consider a **three-eighths-mil plate (.000375)** as optimum, which will require 45 minutes immersion time at 195° F. The bore and chambers are plated in the process. **DO NOT PLUG THE BORES OR CHAMBERS.** If this is done, the plugs will be blown out by the heat and cause the solution to erupt and spill out of the plating tank.

(5) One gallon of plating solution at 195 degrees Fahrenheit will plate 114 square inches of surface to a thickness of one-half-mil (.0005 inches). Or 171 square inches of surface to a thickness of  $\frac{3}{8}$ -mil (.000375 inches). Trying to calculate the number of square inches on a gun is almost impossible. In practical application, if your plating is too thick and causing difficulty in reassembly, simply decrease the amount of time the parts are in the plating solution as this will decrease mil plate in exact ratio. Under normal conditions, a gallon of solution will plate all surfaces on about three .45 Colt Automatic pistols to a one-half-mil thickness; or six .45 Autos to a quarter-mil thickness. There is a complicated process known as "Titration" which is done to determine the nickel



content of the partially used plating solution in order to permit you to replenish the tanks as the solution is used up. Unless correctly done, the results are a poor plating job. Forget it!! Simply follow the above "average" surface area in calculating the strength of the solution and the number of guns that can still be plated.

When in doubt, dump the solution and mix a fresh supply. Yes, some usable solution will be dumped too, but it is poor economics to partially plate a gun, then have to strip and start over because the solution became depleted half way through the plating run. The "dumped" weak solution can be stored in dark brown plastic chemical storage jugs and used to plate other items such as tools, jigs, fixtures, bullet molds, etc., where thickness is not essential but rust retardation is desired.

The Brownell plating solution will plate all types of steel and iron. Cast iron or cast steel are usually porous and difficult to polish to a high luster finish. As the plating will not fill the pores, most cast metals are best plated with a satin-type finish. (It will not plate aluminum satisfactorily.)

As you become more familiar with plating, you will find many uses other than just for firearms and many "special effects" on firearms. You will also quickly learn how much surface area can be plated for various guns in the tank.

(6) Plating bath mixture is exactly 76.5% distilled water, 20% A-1 concentrate and 3.5% B-1 concentrate. Using these percentages and remembering that there are 16 fluid ounces per pint, 32 fluid ounces per quart, 128 fluid ounces per gallon, you can mix any amount of plating solution.

**TO MIX ONE GALLON OF PLATING SOLUTION:** (You must mix components exactly in the order given.)

- a) First measure 98 fluid ounces of distilled water and put into plating tank. Bring temperature up to 100 degrees Fahrenheit with tank heater.
- b) Slowly add 25.5 fluid ounces of A-1 Concentrate, stirring thoroughly. Start mechanical agitator now.
- c) Slowly add 4.5 fluid ounces of B-1 Concentrate, stirring thoroughly. As the B-1 Concentrate is added there will be a slight foaming which is normal.
- d) When the concentrates are thoroughly dissolved and mixing is complete, stir steadily without "whirlpooling" as you bring the plating bath's temperature up to the operating level of 195 degrees Fahrenheit. Check your thermometer frequently as it is easy to go past 195 degrees. At 195 degrees Fahrenheit, allow the solution to steady-down for about 5 minutes, making whatever minor adjust-



ments are required to the heat source to hold the temperature constant.

As the gun parts are lowered into the plating solution, there may be some "gassing" around the parts. This is normal and will slowly decrease during the plating cycle. **DO NOT REMOVE A PART FROM THE SOLUTION ONCE IT HAS BEEN IMMersed.** To do so stops the plating action and if you resubmerge the part, a false plate will form on top of the first plate. **ONCE IN THE SOLUTION - PARTS REMAIN IN THE SOLUTION UNTIL PLATING TIME IS COMPLETED.** Then, and only then, remove the parts.

(7) The gun parts should be held with common iron wire when submerged in the solution. Be sure to make the loop you hang the part on an oversized "O" shape instead of a narrow "U" shape to prevent discoloration streaks on the plated part. And, if possible, twist the free end of the loop back around the hanging part of the wire closing the "O" to keep parts from falling off. The other end of the wire is wrapped around a  $\frac{1}{4}$ " steel rod which lies across the top of the tank. Shorten or lengthen the wire as needed to assure 100% immersion of the part, keeping in mind that the solution level will lower about 1/3rd because of water boil-out during each hour of heating at 195° F. Do not use galvanized, aluminum, copper, or brass wire as these can contaminate the bath. The wire will be nickel plated with the part, of course, but can still be used several times. Silver-soldered sights or soft-soldered parts will not present a problem in the bath.

Screws and pins may be held on wires or inserted in a short section of scrap coil spring and suspended on a wire attached to the hanging rod. Screws may also be installed half-depth back into the gun as the solution will plate the screw and screw hole to full depth. Side plates, etc., may be placed loosely back on the gun. High-grade guns or others with very tight fit and knife-like edges can cause problems. Before plating carefully stone a microscopic chamfer (not more than .003") on all knife edges, leading end of pins, etc. On very-tight fit parts, lap about the same amount off adjoining edges/surfaces to compensate for plating. Keep chamfers and laps to barest minimum so not even visible to naked eye.

Parts should be suspended so that they do not touch tank walls or each other. This is not due to any danger of them becoming fused together by the solution, but remember that the solution is being agitated and the spacing is needed to prevent parts from banging into each other and spoiling the polishing job.

(8) If you have a long plating run and are doing several "batches", you can top-off the tank with distilled water between batches,



then bring up to temperature and put in the next batch. **DON'T ADD WATER TO THE PLATING TANK WHILE PARTS ARE IN THE PLATING SOLUTION.** You most assuredly will ruin the plating job in process and have to strip and replating.

(9) When finished plating, do not store the solution in the plating tank. Allow it to cool to normal room temperature then add enough fresh distilled water to the bath to "top-off" the tank to the total volume you originally started with. (Use the "dip stick" discussed earlier.) Be accurate in this step for you only want to replace the water lost by evaporation during the heating cycle; you don't want to change the chemical make-up of the solution. Then pour the plating solution into the brown plastic chemical jugs and mark the amount of time and area the solution has plated on one of the stick-on labels and put it on the jug. **Plating solutions must not be stored below 50° F. Ideal storage is between 60-to-90° F.**

Next time you are ready to plate all you have to do is flush out the plating tank with clean water to be sure it is contaminate free, (see Note on Water Quality - page 229) pour in the solution from the storage jugs, check the level with the dip stick and bring the temperature back up to 195 degrees Fahrenheit. Always wash the plating tank thoroughly with clean water each time it is used and store in a dust-free place.

## **PLATING OPERATION STEPS**

### **For Nickel Plating Steel**

Before we begin actually plating, it is important that you understand that the thickness of the plating you are going to apply is determined by the three variables: (1) the temperature of the plating bath; (2) the length of time the part is left in the tank; and (3) the number of guns that have been put through that particular solution and (therefore) the amount of free nickel left in it. If you vary any one of these three, you will affect the amount of plating deposited on the gun.

Obviously, the temperature is the easiest factor to control under all conditions. So, watch it closely, and do not vary from the 195° F. required.

Unfortunately, the other two factors are not as easy to control. As the solution is used, nickel is removed from it. Therefore, you will deposit a thicker coat of plating in a brand new bath than in one that has already had guns run through it, providing time-in-bath and temperature are constant. It is nearly impossible to determine exactly how much nickel has been removed during each plating cycle, so there is not way to determine the time-correction



factor to use as the nickel in the bath is depleted. For instance, 2 guns through a five-gallon bath have very little effect on the total nickel available; whereas 1 gun through a one-gallon bath may deplete it nearly one-fourth. We found that if we considered 45 minutes of time, 195° F. temperature and  $\frac{3}{8}$ " mil thickness as optimum at "mid-life" of the plating bath, and took the parts out a few minutes sooner on a brand new bath and left them in a few minutes longer as the bath depleted, satisfactory results were always obtained. It is an extremely subjective situation; there just are no hard and fast rules.

A word of caution is in order. Do not go to extremes in adding time for each gun that you plate. We had a customer who added 15 minutes per gun and at the end of four guns in a one gallon bath had a plating time of nearly two hours. The 4th gun was nearly destroyed because the nickel was by then all gone from the bath, and he was simply cooking the steel in the residual high acid solution for those 2 hours. Just a matter of 2 to 5 minutes shy on the early guns and 2 to 5 minutes added on the later guns is all you should consider.

Twelve steps are required to properly plate a gun. These are outlined below and in the Flow Chart. **DO NOT** take any shortcuts. Do each in turn, as given, for the time specified. Then go on to the next step. Layout of the plating room is completely optional, but do try to set up your tanks so a logical progression from tank to tank can be done handily.

- (1) **POLISHING** - Polish and prepare metal exactly as for bluing. Plating will not hide or fill scratches or pitting. A High Gloss Nickel Finish requires metal preparation equal to master grade bluing preparation. A Satin Nickel Finish can be achieved by using glass beading, very fine sand blasting, or a coarse wire scratch wheel with light pressure on the gun. (See Glass Beading details under "Special Notes" section.)
- (2) **PRE-CLEAN** - This step is absolutely necessary and must not be eliminated. Use Trichloroethane and saturated cotton swabs to thoroughly clean all surface areas including holes, crevices, etc. This removes any old grease and accumulated crud, silicone oils and other gun oils plus polishing residue, especially that left by wax or grease-base polishing compounds. Do not use petroleum base solutions like gas, kerosene, mineral spirits, or gun cleaners as these may leave a residue once the carrier has evaporated. If at all possible, thoroughly blow all parts clean with medium to high pressure air gun to help clean off loosened gunk.



- (3) **FLOWING WATER RINSE** - Submerge parts in the flowing water tank for about ten (10) seconds. This helps float away any loose particles of foreign matter loosened by the pre-clean step.
- (4) **PICKLING TANK** - Submerge parts for three (3) seconds. The parts will start to "gas". This further removes any foreign contamination.
- (5) **FLOWING WATER TANK** - Submerge in tank for three (3) seconds and agitate to flush pickling solution from surface of metal.
- (6) **HOT CLEANER BATH** - Submerge parts in tank for 10 to 15 minutes with operating temperature at 180° F. Agitate occasionally to ensure good surface cleaning.
- (7) **FLOWING WATER TANK** - Submerge for five (5) seconds and agitate to flush cleaning solution from surface of metal.
- (8) **PICKLING TANK** - Submerge for five (5) seconds to "activate" the surface of metal for plating. Parts will start to "gas" indicating surface is activated. This step, in addition to cleaning, will make the nickel "strike" the metal surface quickly assuring a good initial bonding to the surface. If gassing does not occur, refer to #3 under Mixing and Using the Pickling Solution, page 231.
- (9) **FLOWING WATER TANK** - Submerge for three (3) seconds and agitate to flush pickling solution from surface of metal.
- (10) **NICKEL PLATE TANK** - Turn on the heat source and agitation system and bring the plating solution to optimum operating temperature of 195° F. and stabilize. Be sure agitation is started when the heat is first turned on to prevent hot spots in the tank which can cause numerous problems. Next, determine thickness of plate you wish to apply. For optimum results we consider 3/4-mil plate best, which will require 45 minutes of submersion in the plating solution. Submerge parts to be plated into plating solution, being sure they do not touch each other or sides of tank. Be sure that agitation is thorough, and that severe whirlpooling does not develop. Solution must be maintained between 190° and 200° F., with 195° optimum. **ONCE THE PIECES ARE IN THE PLATING SOLUTION DO NOT REMOVE THEM UNTIL THE DESIRED LENGTH OF TIME IS UP. IF YOU DO - EVEN FOR AN INSTANT - YOU WILL RUIN THE PLATING JOB AND HAVE TO START OVER!** When the predeter-



mined time has elapsed to plate the thickness desired, remove the parts from the plating solution.

- (11) **FLOWING WATER TANK** - Submerge for a minimum of two (2) minutes and agitate to flush nickel solution from metal surface. There is no maximum time limit in this tank as the nickel plating process has been completed. Remove from tank and allow parts to dry normally or use compressed air for faster drying.
- (12) **INSPECTION** - Check all parts and components carefully to assure an even plate of all desired surfaces prior to assembly of the gun. (If a part or component is not nickel plated as desired it **CANNOT** be put back into the nickel tank. The part must be stripped of all nickel and re-processed from bare metal.) Wipe all parts clean and dry with a soft cloth to remove water spotting or lingering wet areas in holes, etc. If a high gloss finish is desired, you can buff the parts lightly on a loose muslin wheel (6 inch diameter wheel - 1725 RPM.) to bring up the luster, or we had incredible success with the Professional Nickel Final Polishing Cloth. If you wish to use polish on the wheel, use **ONLY** No. 555 White Polish-O-Ray and very light pressure as any form of polishing will remove metal, and you will be removing the nickel plate you just put on. Simichrome can also be used to increase the luster of a high gloss finish. Reassemble gun.

### **SPECIAL NOTES**

The complete plating procedure consists of two overall phases, both equally important. First is a preparation of the metal to enter the plating solution and second, the actual plating of the metal. Any attempt at short cuts in the procedure usually results in a poor plating job, wasted time and material. At first the process will seem lengthy, especially the cleaning steps prior to putting the piece into the plating tank. However, with a little practice you can complete the plating process in about the same amount of time required for a good blue job.

The Preparation Phase is a step-by-step sequence in getting the metal absolutely clean of all foreign residue and down to the bare metal. When metal is stripped of all protective coating, it absorbs oxygen and oxidizes very quickly when in the open air. Oxidation on the metal surface prevents good initial bonding of nickel to metal. Therefore, the time between each step should be as short as possible. Work quickly but at a steady pace between each step.

Timing in the tanks in seconds does not require a stop watch.



If you say the words, "one thousand and one" it takes one second. Hence "one thousand and one - one thousand and two - one thousand and three" will take three seconds. This is an old trick, but effective.

Equally important is the flushing step between each tank. It prevents the carrying or "drag out" of chemicals from one tank to another tank with resulting chemical contamination of the next tank.

If you can blue guns, you can plate guns. It is only a matter of familiarization and practical experience. The major difference is that plating requires extreme measures to assure parts are clean prior to entering the plating solution.

As with all types of metal finishes, it is best to make a test run by using scrap parts until you become familiar with the process instead of doing the first plating job on a new gun!

*The most common cause of a poor plating job can be directly traced to lack of cleaning or contamination of solutions.*

It is possible to plate one or two parts for two (2) hours in a brand new bath and give them a one-mil plate build-up if desired. This can occasionally be done to tighten up loose-fitting screws, pins, and other slightly worn parts. Plating past this one-mil thickness is not practical. And, be sure to remember that every surface will receive the same amount of plate and increase by the same thickness. So, while you may tighten up the threads of a screw, you may also keep the head from fitting flush, or fitting the counterbore at all.

Agitation of the plating solution is critical, for too great an agitation will result in excessive "whirlpooling" which draws air into the solution and will "crater" your plated surface, requiring that you strip and replating the part because the poor plating cannot be saved. Too little agitation results in "pebbling" of the plated surface (little humps and random bumps). This is more easily remedied, for the part need only be polished carefully with 555 White Polish-O-Ray on a loose Muslin wheel to remove the "pebbles". Be sure to review the section on the Mechanical Agitator, page 226.

It has been reported in various magazines that you can heat nickel plating and make it harder. This is true, and half an hour's heating in an oven at 300° will definitely give you a harder surface. However, it will also turn this nickel a dark mottled blue/blue-black color that is uneven and very unappealing in appearance. In



fact, any time during the plating cycle when the part is heated over 200° in the bath or afterwards, you will tend to destroy the nickel color and turn it this burnt motorcycle muffler color. Avoid overheating the parts that you are plating at all times.

**DO NOT MIX AND ADD MORE FRESH PLATING SOLUTION TO A PARTIALLY USED BATCH.** This is a tempting idea, but don't do it, for you then lose track of the plating capacity of the total solution.

Solution heat-up in the pyrex tanks can be greatly speeded-up by making a "tank jacket" from fiberglass furnace duct insulating panels. Cut to fit like open-ended box. hold corners with duct tape. Make lid from pyrex glass sheet or hi-temp plastic, and be sure to use lids on enamel tanks also, as will cut evaporation.

Electroless Nickel plating will not adhere to stainless steel without a pre-treatment with "Woods Nickel Strike". This is the industrial generic name for putting a piece through a light electroplating nickel plate first before putting it in the electroless nickel solution. This works because electroplated nickel sticks to stainless steel; and electroless nickel will "strike" and stick to electroplated nickel. Lots of bother to do, adds all the drawbacks of electroplating, and frankly, we don't feel it's worth it.

Because of the acids used, parts not directly under the surface of the plating bath will rust badly - worse than in the bluing room. The small amount of water that condenses on hanger rods and falls back into the plating bath is of no consequence. But, do take precautions by keeping all easily rustable equipment and items out of the plating room.

If you are working on a rusty gun that you want to put through a Rust & Bluing Remover Solution, you must do so before you polish the gun. Rust & Bluing Remover contains phosphoric acid which acts as a "passifier" to steel, and will prevent it from plating. Polishing will remove this passified surface, but you must polish thoroughly and completely. Then the Pre-cleaning, Pickling and Cleaning steps in the plating sequence should properly "activate" the steel surface. If you notice that the part does not "gas" in the pickling tank immediately, you may have to leave it in for a *few more seconds or use Full Strength Acid Plunge* (see page 231 - #3 under "Pickling Solution").

Because the real beauty of nickel plating in all its forms - diamond bright, deep satin, light satin, and so on - are nearly impossible to explain to a customer, we suggest you do up sample gun pieces and keep handy to show a prospective plating customer. You've never seen eyes light up till you've told them what their gun can look like - and then bring out the sample to show them!



If your tank has a bad case of "fall out" in which all of the nickel simply falls to the bottom of the tank like bird shot, or the tank foams and fusses, turns color and all the nickel will do is stick to the sides of the tank or fall to the bottom; or for whatever reason the tank stops plating after only one gun, you probably can trace the problem directly to one of the following causes:

- (1) At some point the tank was overheated dramatically, over 200° F., precipitating out the nickel.
- (2) You did not use a heat diffuser between the direct flame/heat source and the bottom of your plating tank. The result was an overheated layer of solution at the bottom of the tank which caused the nickel to fall out and collect at the bottom of the tank, typically in a "donut" of nickel.
- (3) You did not use distilled water to mix the original solutions or you did not carefully check your rinse water for iron, magnesium or metallic ion content. These were dragged into the plating tank in minute, but sufficient, quantities for the nickel to plate them (and fall to the bottom of the tank) instead of plating the gun suspended in the tank.
- (4) The container you are using to plate in has a thin enamel coat, or has been used for enough plating baths that the pin holes typical of enamel ware have plated through to the steel underneath. These spots will continue to plate until all the nickel is pulled out of the solution. The best cure is to replace the faulty/"burned out" tank with a new one.

### **The "Stainless Steel" Look; Sandblasting; And Glass Beading**

The extremely desirable and popular "stainless steel" look for nickel plating is achieved by the way the gun's surface is prepared prior to plating. It is not something that you do in the plating solution. Usually, the soft, satin look (similar to the currently popular "Coltguard" finish) is created by glass beading the gun with very small glass beads. The harder, frosted look is done with coarser beading, and the "bright" frosted look with individual grit reflections is done with sandblasting. When glass beading or sandblasting, the gun's surface must be absolutely clean and down to bare metal **BEFORE** blasting. Both processes have a "peening" effect that forces not only old bluing but also oils, silicones, and other contaminants into the pores of the metal where they act as a barrier to the plating and keep it from adhering properly; (beading is worse in this respect than sandblasting, however, both are guilty). To prevent impacting contaminants into the metal, **BEFORE BEADING/BLASTING, YOU MUST:** 1) Remove any old bluing



by polishing or removing with Brownells Rust and Blue Remover; 2) Degrease the gun thoroughly with 1,1,1, Trichloroethane followed by 3) hot cleaning with Dicro-Clean 909. Only then should you glass bead or sandblast the gun.

With both sandblasting and glass beading, you might especially want to consider the decorative use of these finishes in contrast with bright-finished or even blued surfaces. For instance, sandblast the entire cylinder, then polish back up to bright just the outside, leaving the flutes sandblasted. Or sandblast an entire .45 slide and blue the top a flat matte black, then using Stop-Off Lacquer on the blued top, remove the bluing from the sides with bluing remover or repolish to remove and resandblast/glass bead, then plate the sides. The contrast is very handsome and very pleasing.

When sandblasting, you must use clean Quartz/Silica Sand and you must not recycle the sand because any rust or dirt that you cut off the steel will recycle with the sand and be "blasted" into the surface of the metal where it will act as a contaminant and either give you "rusty" plating or plating that does not adhere properly.

Particular care must be taken with glass beading (and to a lesser extent, sandblasting) as the particles shatter on impact with the steel which causes the "peening" effect but also disperses through the air a fine mist of broken glass particles which can easily be inhaled to do very serious damage to your lungs. Both processes must always be done inside a closed cabinet with a filtered exhaust system.

### **Stainless Steel Plating Tanks**

We talked earlier about not using stainless steel for plating tanks. It can be done; however, the tank must first be "passified" so that the nickel plating solution will not stick to it and will not immediately deplete itself totally by plating the tank it is in. The process is easy, but it is absolutely not guaranteed by us or anybody else to be satisfactory for you. The problem is that the passification of the stainless steel tank may "wear off" at any point and when that happens, the solution will immediately plate all of its available nickel onto the tank. If you wish to passify a stainless steel tank, however, here is the procedure:

- (1) Wash out the stainless steel container thoroughly and treat it with the following nitric acid solution. The solution can be used either hot or cold, the only difference being that the hot acid solution will passify the tank in a shorter period of time.
  - a) For room temperature: use one gallon of industrial grade non-fuming nitric acid to one gallon of distilled water.



Completely immerse the stainless steel container (or fill it absolutely brimfull) and allow it to sit undisturbed for two hours.

- b) Heated method: combine one gallon of regular industrial grade non-fuming nitric acid with four gallons of distilled water. Heat to 120° F. for approximately 30 minutes.
- (2) Pour the nitric acid solution into a dark plastic container of either polyethylene or polypropylene and set it away in a cool dark place until you need to repassify the container again. The container will stay passified for an unpredetermined length of time... in other words you may well lose the passivity at any time during use. It may last 3 or 4 batches or more - or less!
- (3) To test the passivity of the stainless steel tank, mix the following solution:
  - a) Combine four grams of copper sulphate ( $\text{Cu SO}_4$ ) to ten grams of sulphuric acid ( $\text{H}_2\text{SO}_4$ ) and 90cc of distilled water. Mix thoroughly and bottle in plastic or glass. Apply a small amount of this testing solution to the already-passified stainless steel surface. If you get a light pink-colored copper plate on the surface of the stainless steel, it is not passive. And, you must repassify it with the nitric acid solution. If, after testing, no color shows on the stainless steel surface, then it is presumed to be passive and you should be able to plate in it safely. (Be sure to have the colors checked by somebody with true color perception to avoid the problems caused by color blindness!)
- (4) This solution can be saved and should be used to test the tank each time you are intending to use it. Likewise, the nitric acid solution can be reused to passify the stainless steel tanks until the nitric acid solution itself turns blue. Then, it is no longer capable of passifying the stainless steel and should be disposed of safely.

### TROUBLE-SHOOTING CHART For Nickel Plating Steel

In the Trouble Shooting Chart when you are advised to "strip and replate", it does not mean run the part through the stripper and then directly back into the plating tank. It means take the part through the stripping sequence, then through the entire 12 steps of the plating sequence. If you skip a step and put a dirty part back into the plating tank, it will not plate correctly that time either. *You cannot ever skip any step of any sequence.*



## Malfunction

### Probable Cause

### Remedy

#### NEW BATH DOES NOT PLATE

1. Improper make-up.
2. Incorrect bath volume.
3. Temperature too low.

Bring bath into specs if can determine mistake. If not, discard bath.  
Adjust bath if can do so correctly. If not, discard.  
Check Thermometer; heat source. Must operate between 190 - 200° F. with 195° F. optimum.

#### POOR SURFACE ACTIVATION

1. Acid too old or too weak.
2. Oil contamination in tanks.
3. Poor rinsing between cleaning steps.
4. No nickel strike on stainless steel or hardened steels.

If so, remake.  
Find source, clean up, then remake all baths.  
Increase agitation or water flow.  
See special note on "Wood's Nickel Strike" and Full Strength Acid Plunge.

#### "SMUT" FORMS ON SURFACE AFTER PICKLING

Result of over-activation of surfaces by pickling solution.

Wipe off parts with cloth and repickle for shorter time and/or reduce strength of pickling solution.

#### CONTAMINATIONS

1. Check for galvanized, aluminum, copper or brass in tanks, racks, hanging wires, stir rods. Check for leaded steel, heavily soldered or brazed parts.
2. Residual acid left from stripping.
3. Containers, mixing cups, stir rods, etc. mixed between plate bath, cleaning bath, pickle bath.

Discard contaminating metals & remake baths.

Generally will have to discard bath.  
Generally have to discard solutions.  
Always use separate mixing/measuring cups and label for which bath used.

#### RAPID DEPLETION OF A-1, B-1, 778

Poor chemical reaction: result of storage below 50° F.

Return to solution as described below.  
Ideal storage is 60°-90° F.

#### WORKING LIFE DEPLETES TOO SOON

Plating solutions stored in tanks, open containers, and not light proof containers.

MUST ALWAYS be kept in dark brown chemical jugs when not actually in use to preserve working life.

#### SURFACE ROUGH WITH SCRATCHES

Probably not polished to fine enough grit before plating.

Plating will not hide anything!

#### ROUGH AND SCRATCHY SURFACE

Dirt on surface of metal entrapped under plating.

Strip, really clean this time and replating.



**"PEBBLEY" SURFACE**

Plating solution agitation too slow.

Increase speed to make one inch "cone" in center of bath, but do not allow bubbles in solution. Surface can be cleaned up with 555 White polish on loose muslin wheel and very light pressure.

**"CRATERED" SURFACE**

Plating solution agitation too fast.

Slow down agitator with speed control. Part must be stripped and replated. Will not polish out.

**"SANDY" SURFACE**

Took part out of plating bath and put back in during plating cycle.

Do Not Remove Parts Once Put into Plating Tank. You will get a "false plate" which must be stripped and replated if careful polishing does not remove.

**DISCOLORATION ON SURFACE**

1. Shaded "grey" streaks caused by parts touching, hanging loops too tight, too large a part in too small a tank.
2. Adding water during time part is in plating tank.

Use larger tank; run more than one batch. Use "O" shaped hanging loops.

Water to top-off volume can be done only when no parts are in plating tank; then temperature must be restabilized to 195° F.

**SMEARS, STREAKING**

Surface not clean.

Remember, Clean - Clean - Clean and Clean again. Strip and replat.

**PLATING CAME OFF**

1. Surface not clean.
2. Tried to plate Stainless Steel or hardened steels.
3. You took it out of the plating bath to look at it and put it back in for some more plating.

Strip, reclean and plate. See "Special Notes" for comments on cleaning prior to sandblasting and glass beading. See special note on "Wood's Nickel Strike" and Full Strength Acid Plunge. You cannot do this for it will "false plate" and may come off. Strip and replat.

**PLATING TOO THIN**

1. Tried to plate with depleted solution.
2. Check surface area-to-volume of plating bath ration. 1 gallon does only 114 square inches  $\frac{1}{2}$ -mil thick.

Check mil-usage record on storage jug. Make new solution then strip and replat. May require larger container and more solution volume.

**PLATING TOO THICK**

Too long in plating bath.

Reduce time in plating bath. 1 hour gives  $\frac{1}{2}$ -mil; 45 minutes gives  $\frac{3}{8}$ -mil;  $\frac{1}{4}$



## PLATING TOO THICK - Continued

hour gives  $\frac{1}{4}$ -mil. Generally thick plating can be polished off with 555 White on loose muslin wheel adjusting pressure and checking fit often. Be sure not to cut thru plating.

## CASE HARDENED / CAST STEEL PLATES UNEVENLY

1. Many Case hardened surfaces do not activate as well as unhardened steels.
2. High silicone content of some cast steels may inhibit plating.
3. Cast parts will usually not polish well enough for "Bright" Nickel Plating.

Leave in pickle tank longer than normal until good gassing occurs. See note on Full Strength Acid Plunge. Pre-clean to the point of "overkill" with Tricloroethane to remove silicone. Suggest sandblasting cast surfaces before plating for a deluxe "Satin" Nickel Finish.

**CHEMICAL STORAGE:** If these solutions become colder than 50° F. during transportation or storage, the solution will separate. Do not attempt to use the SEPARATED SOLUTION. IT WILL NOT WORK PROPERLY. To return the chemicals to solution: Dump the entire contents of the jug, including the crystals and sludge, into a container with a clean, non-metal surface. Heat to 150° F. and stir with a clean non-metal rod until all crystals and sludge are redissolved and the solution is clear.

## STRIPPING NICKEL FROM GUNS

There are essentially four ways to take nickel off a gun. You can polish it off, but for the sake of these instructions, we will assume you do not wish to do that for whatever reason.

Secondly, there is a process in the electroplating field that removes nickel plating by making the gun the anode and a piece of stainless steel the cathode so that the electrical current transfers the nickel from the gun into the special "stripping solution".

Thirdly, you can use pure nitric acid. As long as the nitric acid is pure, it will strip nickel from iron or steel without attacking the base metal. This works fine until the humidity in the air changes the purity of the acid, and then it literally dissolves a gun in a very few minutes - plating and all. Besides, nitric acid is very dangerous to handle, nearly impossible to ship via any common carrier, and is expensive to use relative to the amount of nickel actually removed. Finally, under certain conditions, nitrous oxide is formed which can damage lungs, and result in permanent injury to the operator.

The fourth is a hot bath stripping system in which the parts are immersed in a heated plating solution until the nickel is re-



moved from the base material (or substrate). In order to meet more of the needs of the gunsmithing industry, we have chosen 2 different stripping solutions which provide between them full range stripping of all types of electroless and electro nickel plated steel, *brass and other copper bearing alloys without damage to the base metal.* The differences between and advantages of the individual solutions are important to understand, though, before you decide which you wish to use in your plating operation. You may well decide, as we did, that you will best be served if you set up for both baths.

**#778 STRIPPER** - This is the original stripper we first carried when we introduced the nickel plating system. It is specifically designed to remove the Brownell Electroless Nickel as quickly and efficiently as is possible with least damage to the substrate, removing at the rate of .5 mil per hour. Operating temperature is 200-210° F. The solution will remove 5 mil ft/gal total requiring replenishment every 1.25 mil/ft of nickel removed. The solution requires either a 304 or 316 Stainless Steel, ceramic, quartz, pyrex or polypropylene tank. It cannot be used on aluminum; and if used on brass or copper alloys, it will remove the plating then begin to attack the copper base metal underneath. We recommend this stripper as the best and fastest way to remove Brownells Electroless Nickel from steel or steel alloy pieces. If you are not going to be working with brass, this is the only stripper you should buy or use because of its much greater operating speed. A typical .45 Auto frame will strip back to base metal in this stripper in approximately 1 to 2 hours.

**#1082 STRIPPER** - This new stripper was added to our line because it is a more versatile stripper and will remove all electroless nickel plating (ours and everyone elses) plus - most electroplated nickel plating - from ferrous steel and its alloys, brass, and other copper bearing alloys. Removal rate is .5 mil per 1.33 hours. Operating temperature is 170-175° F. The solution will remove 3 mil ft/gal total requiring replenishment every 1 mil/ft of nickel removed. The solution will operate in any stainless steel, normal steel, pyrex, ceramic, polypropylene, or quartz container. It cannot be used to remove plating on aluminum, but can be used on both steel or copper alloys without attacking either base metal. When you have to remove electroplating, or a brand of electroless nickel other than Brownells Electroless Nickel Plating, we recommend you use the #1082 Stripper on all steel and ferrous alloys plus brass and copper alloys. (To remove only the Brownells Electroless Nickel Plating for steel/ferrous alloys, we recommend the #778 Stripper discussed above.) The #1082 Stripper generally does



a better job of removing most original factory nickel plating that comes into the shop. It is quite a bit slower, however: a typical .45 frame will strip clean in about 3 to 4 hours.

Both systems are safe and will not etch steel. They have excellent stability and a long, active solution life. Because of the easy replenishment, solution life can be further extended which will reduce the operating costs. None of the stripping components contain cyanide, so that they can be shipped easily by UPS. Each system operates at a relatively low stripping rate which gives you complete control. However, neither system is designed to strip nickel plating from aluminum, aluminum alloys or manganese alloys. Do not put these metals into the stripping solutions because the base metal will be severely damaged.

As with the plating procedure, the gun should be disassembled and heavy emphasis placed on cleaning. This thorough cleaning prior to beginning the stripping sequence removes all gunk, gun oils and so on - and must be done to allow the stripping operation to work efficiently.

### **BROWNELLS #778 ELECTROLESS STRIPPER**

#### **Stripping Tanks**

Three tanks are required for the stripping operation. Two of these cannot be the same tanks used in the plating sequence. They must be different ones to avoid cross-over contamination. Be sure and mark them plainly "**FOR STRIPPING ONLY**", and preferably keep them in a different storage area. Because similar chemicals and solutions are involved, the same strict personal safety precautions must be followed as specified in the plating section.

(1) **#778 STRIPPING TANK** - Usually a fairly small tank can be used for this operation for seldom is more than one gun stripped at a time. The tank can be stainless steel (Grades 304 or 316 **ONLY!**), ceramic, pyrex, quartz or other suitable materials that can withstand the 200-degree Fahrenheit operating temperature. Because of their convenience and availability we carry a gallon pyrex/laboratory tank, and these instructions are written for that tank. If you choose to use other tanks, please do take into account their peculiarities when using these stripping solutions in them.

When the heat source is the Electric Hot/Stir Plate, the pyrex tank can be placed directly on the heating plate as detailed earlier. The same in-tank magnetic stir rod may be used for both plating and stripping solutions, but it must be thoroughly washed in clean water between uses.

When a direct gas flame is the heat source, the pyrex tank must be protected from thermal shock. Special instructions are in-



cluded with each pyrex tank explaining in detail how to make a "sand bath" to protect the tank and keep it from breaking.

(2) **#778 ACID CLEANING TANK** - Since the purpose of this Acid bath is to clean only, the C-1 Additive is not used in the solution. Thus, the solution is simply 50% Brownells Hydrochloric Acid and 50% distilled water. The tank must be covered when not in use, and must be marked "Stripping Only" to prevent any mix-up with the Plating Pickling Tank.

**TO MIX ONE GALLON OF ACID SOLUTION** (Do these steps exactly in the sequence given!)

- a) Measure 2 quarts (64 fluid ounces) of distilled water and pour into the tank.
- b) Measure 2 quarts (64 fluid ounces) of Brownells Hydrochloric Acid and pour slowly into the distilled water already in the tank. Remember, *Always add the Acid to the water*. Never do it any other way!

(3) **HOT CLEANING TANK** - All guns and parts to be stripped must be clean and free of oil, dirt, etc. If you are stripping a gun that just came into the shop, you **MUST DO THIS STEP**. If you are stripping a gun to remove plating that did not take correctly and the gun is coming straight from your plating tanks and has not been handled/oiled/polished and the surface is still clean, this step can be eliminated.

As described in the plating section, the Hot Cleaning Tank can be the same one used with either the Nickel Plating set-up or your Bluing operation. Remember... cleanliness is still a major factor, so don't take any chances with crossover contamination. If only one gun is to be stripped, a small round porcelain tank on the gas ring or the pyrex tank on the Hot/Stir Plate may be used.

**TO MIX ONE GALLON HOT CLEANING SOLUTION:**

- a) Mix 8 oz. by weight (approximately 1 cup by volume) of Brownells Dicro-Clean 909 per gallon of clean water.
- b) Heat to 180 degrees F. and stabilize temperature.
- c) Suspend parts in the cleaning bath for 10-15 minutes.

### **#778 Technical Information On**

#### **Mixing & Using The Stripping Solution**

**TO MIX ONE GALLON #778 STRIPPING SOLUTION** (Do these steps exactly in the sequence given!)

- a) Wash the Stripping Tank with clean water to remove any residue or possible contaminate.
- b) Pre-measure 1 gallon of water in your tank, and make note of its depth on your dip stick - or in your dip stick record log. Dump and dry the tank.



- c) Measure 51 fluid ounces of distilled water and pour into the Stripping Tank.
- d) Measure 32 fluid ounces (one quart) of Concentrate 778, and pour slowly into the water already in the tank. The solution will turn a light yellow.
- e) Begin mechanical agitation of the solution at a moderate rate.
- f) Begin heating the solution, and bring up to 120° F. The solution will turn a bright yellow.
- g) Measure 1.25 pound dry weight of Concentrate 778-R.
- h) Slowly add the powdered Concentrate 778-R to the solution allowing the heat and agitation to dissolve the powder. (Note: the slow rate of adding the Concentrate 778-R to the heated agitating bath will dissolve the powder much faster than if the entire measured amount is just dumped into the tank.) It often takes from 5 to 10 minutes before the powder is fully dissolved and the bath changes to a dark yellow and becomes translucent, looking like warm cooking oil.
- i) Add sufficient distilled water to bring the total solution volume up to one gallon as measured by the dip stick.
- j) Bring the solution up to operating temperature of 200-210 degrees Fahrenheit. Do not exceed the 210-degree maximum. Check the thermometer several times to be sure that the heat setting is holding the temperature constant. When it is, the Stripping Solution is ready for use.

During use the stripping solution will darken noticeably, and after 2-3 hours of use will become the color of deep mahogany - and may become even as dark as very strong tea. This is normal and occurs as you strip nickel plating off the parts.

Parts are suspended on iron wire, just as in the plating process. Do not use other kinds of wire. Be sure to make large closed "O" loops as you did in plating.

Once parts are submerged in the stripping solution they should not be removed until stripping is complete to avoid contamination. We found we could remove the parts, wash in the Flowing Water Tank, run back through the Acid Cleaning Tank, re-rinse in the Flowing Water Tank and put back into the Stripping Tank with no apparent damage. However, it is better left alone.

As water is evaporated out of the Stripping Tank, it should be replenished. Use the dip stick method, or make a mark on the side of the pyrex tank. Do not allow parts to stick above the solution level as the fumes from the stripping solution cause very rapid rusting and pitting - which does not happen to parts that are left submerged.



The rate of stripping will vary greatly depending upon the type and thickness of plate that is being removed, and even on how good the "strike" was when the plating was put on. Most will fully strip between 1 hour and 2 hours. If parts do not strip in 2½ to 3 hours, the solution is too weak and must be replenished. On some guns the nickel plate is deposited on top of a copper plate which was put on the metal first as an undercoat for the nickel. These pieces will strip slowly, and the #778 solution will attack the copper causing it to turn dark. Remove the parts immediately as they will not strip any further; the copper plating and dark scale must then be polished off.

Agitation of the solution is important, and is done at the same rate as for plating. If the solution is not agitated, stripping will be much slower because the stripping solution remaining close to the metal becomes supersaturated with removed nickel and slows down in removing more. Fresh solution must flow by the metal surfaces at all times to distribute the dissolved nickel throughout the full gallon of stripping solution. Consequently, smooth surfaces will strip faster than beaded or sandblasted ones.

One gallon of fresh stripping solution will remove the nickel plating from about 4 Colt .45 Autos. After this, the solution normally must be replenished.

#### **TO REPLENISH THE #778 STRIPPING SOLUTION:**

- a) Be sure no guns or parts are in the Stripping Tank.
- b) Be sure agitation system is working, solution is agitating thoroughly, and temperature is at 200-210° F.
- c) Add 2 ounces by dry weight of Concentrate 778-R to the Stripping Solution.
- d) Continue agitation until all the Concentrate 778-R is dissolved.

This replenishment will normally allow stripping approximately the same amount of nickel as did the original fresh solution. However, after four (4) replenishments of the same stripping solution with Concentrate 778-R, the solution will become supersaturated with dissolved nickel and will fail to strip any more. Dump the solution, wash the tank thoroughly with clean water and mix up a fresh solution.

After stripping is completed, turn off the heat. If using a pyrex container, leave the solution in the tank and allow both to cool to normal room temperature while still sitting on the Hot/Stir Plate. If you take the pyrex tank off the Hot/Stir Plate and set it on a cold bench or counter top you will cause thermal shock and break the tank. Once cooled, do not store the stripping solution in the Stripping Tank. Pour it into a clean brown plastic chemical



jug. Be sure to mark the jug "STRIPPER" and put on the label how many times the solution has been replenished. To reuse, simply pour back into the thoroughly clean Stripping Tank, bring up to heat with agitation to correct operating temperature and begin the cycle.

Stripping is a slow process and of all the sequences involved with nickel plating the most worrisome, for very shortly after you put the plated piece into the stripping solution the piece turns a rough grey-iron color and texture. As time goes by the color gets worse and more mottled. Finally - at what we thought was a nerve-rackingly slow rate, the krud disappeared and the clean bright steel was underneath all that motley stuff. Surely would recommend you don't hover over the stripping tank expecting instant removal. Doesn't work that fast because if it did, you'd stand a good chance of damaging the steel. Working as slowly as it does you won't pit or etch the steel, and you may not have to do even much more than touch-up polishing if you are stripping and replating a piece that is in good shape.

#### #778

#### Stripping Operational Steps

- (1) **PRE-CLEAN** - Use trichloroethane on cotton swabs and brushes to remove as much foreign matter, powder residue, gun oils, etc., as possible. Do not use a petroleum base cleaner such as gas, kerosene, mineral spirits, or gun cleaners; they will leave a residue on the part.
- (2) **FLOWING WATER** - (Use same tank as used for plating process.) Submerge parts for ten (10) seconds and agitate to float away loosened residue.
- (3) **HOT CLEANER BATH\*** - Submerge parts in tank for 10 to 15 minutes with operating temperature at 180° F. Agitate occasionally to ensure good surface cleaning.
- (4) **FLOWING WATER TANK\*** - Submerge parts in tank for five (5) seconds and agitate to flush cleaning solution from surface of metal.
- (5) **ACID CLEANING TANK** - Submerge parts for three (3) seconds and agitate. This further cleans parts and removes foreign residue, especially oil.
- (6) **FLOWING WATER** - Submerge parts for five (5) seconds to flush acid cleaner from surface of metal.
- (7) **NICKEL STRIPPING TANK** - Submerge parts in Stripping Tank until all nickel is removed from the bright steel base metals. The stripping solution must operate at 200-210 degrees Fahrenheit. Water lost by evaporation



should be replaced during the stripping cycle in order to maintain the original volume of solution. Parts will have to be removed from the Stripping Tank to be thoroughly checked to see that they are completely clean of the nickel plating (note earlier comments on how to do this).

- (8) **FLOWING WATER TANK** - Submerge parts for two (2) minutes to flush away all of the stripping solution. Allow stripped parts to air dry normally, or use compressed air to speed drying. The gun can now be polished or put back through the plating cycle. If you are not going to polish or plate immediately, be sure to oil gun surfaces with Water Displacing Oil, Nye Oil, "HOLD", Brownells No. 2 or some other basic rust preventative which does not contain any of the exotic penetrants which could contaminate future bluing or plating of the gun.

\*These steps required only when stripping dirty guns or guns just coming into your shop.

### **BROWNELLS #1082 NICKEL PLATING STRIPPER Stripping Tanks**

Three tanks are required for the #1082 stripping operation - the acid cleaning tank, the stripping tank, and the hot cleaner tank. The acid cleaning tank and the stripping tank cannot be the same ones used in the plating sequence - they must be different to avoid cross-over contamination. To avoid any problems, they should be marked "For Stripping Only", and preferably keep them in a different storage area. Because similar chemicals and solutions are involved, the same strict personal safety precautions must be followed as specified in the plating section.

(1) **#1082 STRIPPING TANK** - The tank can be mild steel, stainless steel (any grade), ceramic, pyrex, quartz or other suitable materials that will withstand the 170-175° F. operating temperature. The pyrex tank like the one that you use for nickel plating, is very convenient for stripping. If you were stripping from a large surface such as a long barreled revolver or a barreled rifle action, you may wish to use either the porcelain tanks or one of the long gun (6x6x40") regular or stainless steel bluing tanks.

(2) **#1082 ACID CLEANING TANK** - The same acid cleaning solution is used with stripper 1082 as with 778 and the solution is again 50% Brownells Hydrochloric Acid and 50% distilled water. The tank must be covered when not in use, and must be marked "Stripping Only" to prevent any mix-up with the Plating Pickling Tank.



**TO MIX ONE GALLON OF ACID SOLUTION:** (Do these steps exactly in the sequence given!)

- a) Measure 2 quarts (64 fluid ounces) of distilled water and pour into the tank.
- b) Measure 2 quarts (64 fluid ounces) of Brownells Hydrochloric Acid and pour slowly into the distilled water already in the tank. Remember, *Always add the Acid to the water.* Never do it any other way!

**(3) HOT CLEANING TANK** - All guns and parts to be stripped must be clean and free of oil, dirt, etc. If you are stripping a gun that just came into the shop, you **MUST DO THIS STEP.** If you are stripping a gun to remove plating that did not take correctly and the gun is coming straight from your plating tanks and has not been handled/oiled/polished and the surface is still clean, this step can be eliminated.

As described in the plating section, the Hot Cleaning Tank can be the same one used with either the Nickel Plating set-up or your Bluing operation. Remember... cleanliness is still a major factor, so don't take any chances with cross-over contamination. If only one gun is to be stripped, a small round porcelain tank on the gas ring or the pyrex tank on the Hot/Stir Plate can be used.

**TO MIX ONE GALLON HOT CLEANING SOLUTION:**

- a) Mix 8 oz. by weight (approximately 1 cup by volume) of Brownells Dicro-Clean 909 per gallon of clean water.
- b) Heat to 180 degrees F. and stabilize temperature.
- c) Suspend parts in the cleaning bath for 10-15 minutes.

### **Technical Information On**

### **Mixing & Using**

### **The #1082 Stripping Solution**

**TO MIX ONE GALLON STRIPPING SOLUTION:** (Do these steps exactly in the sequence given!)

- a) Wash the Stripping Tank with clean water to remove any residue or possible contaminate.
- b) Pre-measure 1 gallon of water in your tank, and make note of its depth on your dip stick - or in your dip stick log. Dump and dry the tank.
- c) Measure 90 fluid ounces of distilled water (hot or cold) and pour into the Stripping Tank. Start agitation and heating.
- d) Measure one half pound of 1082-R and very slowly add to the water in the tank, allowing the agitation to dissolve the powder. (Note: the slow rate of adding the 1082-R to the agitating bath will dissolve the powder much faster than if the entire measured amount is just dumped into



the tank.) It often takes three to five minutes before the powder is dissolved and the bath changes to a clear, amber color.

- e) Measure 26 fluid ounces of Concentrate 1082 and very slowly add to the Stripping Tank.
- f) Add sufficient distilled water to bring the total solution volume up to one gallon as measured by the dipstick.
- g) Bring the solution up to the operating temperature of 170-175 degrees F. Higher temperatures shorten bath life. Check the thermometer several times to be sure the heat setting is holding the temperature constant. When it is, the Stripping Solution is ready to use.

During normal use the stripping solution will darken, and after 2-3 hours of use will be considerably darker than what it started out to be. This is expected and occurs as you strip the nickel plating off the parts.

Parts are suspended on iron wire, just as in the plating process. Do not use other kinds of wire. Be sure to make large closed "O" loops as you did in plating.

Once the parts are submerged in the stripping solution, they should not be removed for any extended period of time to avoid contamination. However, the parts can be taken out of the tank for a very brief period of time for inspection (to see how the stripping is progressing) and returned directly back into the stripping tank. We found we could remove the parts, if absolutely necessary, for longer periods of time, but they then have to be run through the Flowing Water Tank, the Acid Cleaning Tank, re-rinsed in the Flowing Water Tank and then put back in the Stripping Tank, with no apparent damage. Although, it is better if the parts are not left out of the Stripping Tank that long, once actual stripping has begun.

As water is evaporated out of the Stripping Tank, it should be replenished. Use the dip stick method, or make a mark on the side of the pyrex tank. Do not allow parts to stick above the solution level as the fumes from the stripping solution cause very rapid rusting and pitting - which does not happen to parts that are left fully submerged.

The rate of stripping will very greatly depend upon the type and thickness of the plate that is being removed, and even on how good the "strike" was when the plating was put on. Most parts will fully strip between 3 or 4 hours. If parts are not stripped in 4 hours, check the parts to see if there is evidence that some stripping has occurred. If the plating has changed color and shows signs of being removed, continue for a while longer. If there seems



to be no change in the surface, the solution is too weak and needs to be replenished.

Agitation of the solution is important, and is done at the same rate as for plating. If the solution is not agitated, stripping will be much slower because the stripping solution remaining close to the metal becomes super-saturated with removed nickel and slows down in removing more. Fresh solution must flow by the metal surfaces at all times to distribute the dissolved nickel throughout the full gallon of stripping solution. The surface finish will have an effect on stripping time, too. For instance, a .45 Automatic Slide with polished sides and glass beaded top will have sides stripped first, and the top stripped last.

One gallon of fresh stripping solution will remove the nickel plating from about 2-3 Colt .45 Autos. After this, the solution normally must be replenished.

#### **TO REPLENISH THE #1082 STRIPPING SOLUTION:**

- a) Be sure no guns are in the Stripping Tank.
- b) Be sure agitation system is working, solution is agitating thoroughly, and the temperature is a 170-175° F.
- c) Add 4 ounces by dry weight of 1082-R to the shipping solution.
- d) Continue agitation until all the 1082-R is dissolved.
- e) Add 2.5 ounces of Brownells Ammonium Hydroxide to the stripping solution.
- f) Continue agitation until the Ammonium Hydroxide is thoroughly mixed and the solution is up to proper working temperature.

This replenishment will normally allow stripping approximately the same amount of nickel as did the original fresh solution. However, after four (4) replenishments of the stripping solution with 1082-R, the solution will become super-saturated with dissolved nickel and will fail to strip any more. Dump the solution, wash the tank thoroughly with clean water and mix up a fresh solution.

After stripping is completed, turn off the heat. If using a pyrex container leave the solution in the tank and allow both to cool to normal room temperature while still sitting on the Hot/Stir Plate. If you take the pyrex tank off the Hot/Stir Plate and set it on a cold bench or counter top you will cause thermal shock and break the tank. Once cooled, do not store the stripping solution in the Stripping Tank. Pour it into a clean brown plastic chemical jug. Be sure to mark the jug "Stripper" and put on the label how many times the solution has been replenished. To reuse, simply pour back into the thoroughly clean Stripping Tank, bring up to heat with agitation to correct operating temperature and begin the cycle.



Stripping is a slow process and of all the sequences involved with nickel plating the most worrisome, for very shortly after you put the plated piece into the stripping solution the piece turns a dark grey color and gets worse and more mottled. Finally - at what we thought was a nerve-rackingly slow rate, the crud disappeared and the clean bright steel was underneath all that motley stuff. Surely would recommend you don't hover over the stripping tank expecting instant removal. Doesn't work that fast because if it did, you'd stand a good chance of damaging the steel. Working as slowly as it does you won't pit or etch the steel, and you may not have to do even much more than touch-up polishing if you are stripping and replating a piece that is in good shape.

### #1082 Stripping Operational Steps

- (1) **PRE-CLEAN** - Use trichloroethane on cotton swabs and brushes to remove as much foreign matter, powder residue, gun oils, etc., as possible. Do not use a petroleum base cleaner such as gas, kerosene, mineral spirits, or gun cleaners; they will leave a residue on the part.
- (2) **FLOWING WATER** - (Use same tank as used for plating process.) Submerge parts for ten (10) seconds and agitate to float away loosened residue.
- (3) **HOT CLEANER BATH\*** - Submerge parts in tank for 10 to 15 minutes with operating temperature at 180° F. Agitate occasionally to ensure good surface cleaning.
- (4) **FLOWING WATER TANK\*** - Submerge parts in tank for five (5) seconds and agitate to flush cleaning solution from surface of metal.
- (5) **ACID CLEANING TANK** - Submerge parts for three (3) seconds and agitate. This further cleans parts and removes foreign residue, especially oil.
- (6) **FLOWING WATER** - Submerge parts for five (5) seconds to flush acid cleaner from surface of metal.
- (7) **NICKEL STRIPPING TANK** - Submerge parts in Stripping Tank until all nickel is removed from the bright steel or brass base metal. The stripping solution must operate at 170-175° F. Water lost by evaporation should be replaced during the stripping cycle in order to maintain the original volume of solution. Parts will have to be removed from the Stripping Tank to be thoroughly checked to see that they are completely clean of the nickel plating (note earlier comments on how to do this).
- (8) **FLOWING WATER TANK** - Submerge parts for two (2) minutes to flush away all of the stripping solution. Allow



stripped parts to air dry normally, or use compressed air to speed drying. The gun can now be polished or put back through the plating cycle. If you are not going to polish or plate immediately, be sure to oil gun surfaces with Water Displacing Oil, Nye Oil, "HOLD", Brownells No. 2 or some other basic rust preventative which does not contain any of the exotic penetrants which could contaminate future bluing or plating of the gun.

\* These steps required only when stripping dirty guns or guns just coming into your shop.

### NICKEL-ON-BRASS

A system for being able to Nickel Plate on Brass has been added to our line at the request of many gunsmithing customers - and for an amazing variety of uses in their shops. Much of the work centers around nickel plating older guns with brass frames - or some of the newer imports with brass parts too. Plus, restoration of many other collectibles that were originally nickel plated over brass - a field that covers such diverse things as fire engine and railroad memorabilia to old Aladdin lamps, hunting equipment and so on. One of the hottest areas for the gunsmith right now is nickel plating empty brass cases for the reloaders. For several years now a few of the most popular caliber cases - from one or two of the major factories - have been available nickel plated. The nickel plating greatly extends the case life allowing many more reloads per case; improves extraction and makes for smoother functioning; reduces build-up of tarnish residue in the primer pocket and on the case body; makes the cases easier to clean and get ready for reloading; and has been reported to improve accuracy for competition and other serious shooting. With the mushrooming popularity of some of the trickier competitive shooting today, you and your customers need every edge you can get - and nickel plating your brass may just be the trick that did it.

It is a simple addition to make to your plating operation - requiring only a new Nickel-On-Brass Activator to make the nickel plating stick firmly to the brass/copper alloy; and a different hot cleaner tank solution formula, operating temperature and time. (The regular one used for cleaning steel prior to bluing and plating is just too strong and will damage the surface of the metal if used on brass/copper alloys.) The actual plating of the nickel on the metal is the same and plating nickel on steel, and the same rules/procedures/advantages apply.

Nickel-On-Brass has many applications that we haven't even thought of yet - it is a good service to offer to your shop's area to



bring more customers into your shop and get more of them to leave some money behind.

### Technical Information On Mixing And Using Pickling Solution For Nickel-On-Brass Plating

(1) **A NOTE ON ACIDS:** The Hydrochloric Acid (HCL) furnished by Brownells is a 31% pure concentrate. This is equivalent to an 18° Baumé Muriatic Acid (HCL). Either acid can be used in the mixing of the pickling solution as they are both exactly the same chemically... only the name is different. However, Hydrochloric Acid is available in concentrations as high as 37.3% which has a specific gravity of 1.18 and is equivalent to 23° Baumé Muriatic Acid. This concentration is too strong; do not purchase it or use it, for it may result in damage to the gun.

**TO MIX ONE GALLON OF PICKLING SOLUTION FOR NICKEL-ON-BRASS:** (Do these steps in exactly the sequence given!)

- a) Measure out 115 fluid ounces of distilled water and pour into the tank. (Remember, this must not be a metal tank!)
- b) Next measure out 13 fluid ounces of Brownells Hydrochloric Acid and very slowly add it to the water. Stir thoroughly.

The Pickling "Activator" Solution is now ready for use. This tank is not heated but is used at room temperature. The solution may remain in the tank when not in use, but it must be covered to avoid air-borne particles from contaminating it. (Remember - this solution is for use when plating brass or copper alloy products only.)

(2) Be sure you control the amount of time gun parts remain in the pickling solution. Do not leave a part in the solution in excess of one minute as solution will begin to etch metal. If a part is dropped into the solution, do not remove by hand - use a wire or rod to remove the part. *It is recommended that a new solution be made up after approximately twelve (12) average size guns have been through the tank to assure correct function.*

(3) **DO NOT USE** the C-1 additive with the pickling solution when plating brass or any other copper alloy.

(4) When immersed, brass or copper alloy products may not show any visible sign of "gassing" as may be seen when pickling some steel products. **DO NOT** leave the brass pieces in the pickling bath longer than 3-5 seconds, with or without gassing.



### Technical Information On Mixing & Using Hot Cleaning Bath For Nickel-On-Brass Plating

(1) Determine the size tank you wish to use and the volume of solution it will conveniently hold in gallons (ie: 1-gal., 1½-gal., 2¾-gal., etc.)

(2) If you already have a bluing tank set-up, the same tank can be used, but be sure to change the solution mix to this ratio. Do not use the stronger solution used for plating steel or the solution used for cleaning prior to bluing as these solutions are too powerful for brass or copper alloys, and will damage the metal.

#### TO MIX ONE GALLON HOT CLEANING SOLUTION:

- a) Mix 4-oz. by weight (approximately ½ cup by volume) of Brownells Dicro-Clean 909 per gal. of clear water.
- b) Heat to 150° F. and stabilize temperature.
- c) Suspend parts in the cleaning bath for 5 minutes.

Do Not exceed the amount of cleaning chemical, bath operating temperature or cleaning time when working with brass or copper alloys. To do so will create a condition on the surface of the metal that will prevent the nickel "striking" correctly or bonding properly.

During the cleaning cycle, the surface of the brass or copper alloy will turn slightly "lighter color" and takes on a "very clean look". This is normal and indicates proper cleaning action. Improper cleaning is indicated by the metal surface taking on a "frosted look", or a slight dulling of the high gloss shine you put on it. (This is very subjective depending a great deal on the composition of the brass or copper alloy being cleaned.)

### Technical Information On Mixing & Using The Nickel-On-Brass, No. D-11 Activator

(1) **WARNING:** The No. D-11, Nickel-On-Brass Activator furnished by Brownells **MUST** be mixed with either distilled or deionized water. Use of any other type of water will make the mixture ineffective.

#### TO MIX ONE GALLON NO. D-11 NICKEL-ON-BRASS ACTIVATOR SOLUTION:

- a) First measure 100 ounces of room temp. (70° F.) distilled or deionized water and put into a non-metallic container.
- b) Then measure 28 ounces of D-11, N-O-B Activator and slowly add to the water.
- c) Mix thoroughly with non-metallic spoon.
- d) The D-11, N-O-B Activator operating temp. is 70°-90° F.,



and if necessary heat this solution so it is within this temperature range when used. Using at temperatures too cool will inhibit proper activation of the metal surface.

During the activation cycle, the brass or copper alloy will normally turn back from the "super clean" look it got in the hot cleaning tank to a color closer to the highly-polished look it had prior to going into the D-11 Activator. This color change of returning to "normal" is a good indication of proper surface preparation and activation. This is a subtle change, but will be there. If there is no change in the look of the surface of the metal, the D-11 Activator is probably depleted and should be replaced. Do not attempt to plate a part that has not had a good surface activation for the surface will still contain contaminants that will prevent it from "striking" properly and the nickel from adhering.

An easy way to check for the color change that is supposed to occur in the D-11 Activator is to suspend a cleaned test piece of brass/copper alloy  $\frac{1}{2}$  its length into the D-11 Solution. The color change then becomes very apparent. We suggest you keep a good test piece available as a reference piece to check future work against.

### **Technical Information On Nickel-On-Brass Plating Solution**

(1) The plating solution for plating Nickel-On-Brass is exactly the same plating solution used to plate nickel on steel. Please refer to the appropriate mixing instructions for making-up your plating solution. Then return to this section for information on how to use the solution correctly to get the fine plating job on brass that you want.

(2) It doesn't seem to matter whether the Plating Solution has been used to plate steel at any time during its useful life or not, nor if one bath of brass is put through followed by a batch of steel. In fact, we have found in our experiments that you can actually mix steel and brass pieces in the same plating bath as long as the brass pieces have been properly activated with the D-11 Activator and everything will plate as it is supposed to. When running both metals at the same time, however, be sure to bear in mind the differences required between the two and follow the individual steps carefully - or else you will have a failure!

### **PLATING OPERATION STEPS For Nickel-On-Brass**

Fourteen steps are required to properly plate brass or copper alloy products. These are outlined below and in the flow chart



prepared specifically for this material. **DO NOT** use the flow chart for steel products as these steps are different. **DO NOT** take any shortcuts. Do each step in turn, as given, for the time specified. Then go on to the next step. Layout of the plating room is completely optional, but do try to set up your tanks so a logical progression from tank to tank can be done handily.

- (1) **POLISHING** - Polish and prepare the metal as you want the finished part to look. Plating will not hide or fill scratches or pitting. A High Gloss Nickel Finish requires metal preparation equal to master grade bluing preparation. A Satin Nickel Finish can be achieved by using glass beading, very fine sand blasting, or a coarse wire scratch wheel with light pressure on the wheel. (See Glass Beading details under "Special Notes" section.)
- (2) **PRE-CLEAN** - This step is absolutely necessary and must not be eliminated. Use Trichloroethane and saturated cotton swabs to thoroughly clean all surface areas including holes, crevices, etc. This removes any old grease and accumulated crud, silicone oils and other gun oils plus polishing residue, especially that left by wax or grease-base polishing compounds. Do not use petroleum base solutions like gas, kerosene, mineral spirits, or gun cleaners as these may leave a residue once the carrier has evaporated. If at all possible, thoroughly blow all parts clean with medium to high pressure air gun to help clean off loosened gunk.
- (3) **FLOWING WATER RINSE** - Submerge parts in the flowing water tank for about ten (10) seconds. This helps float away any loose particles of foreign matter loosened by the pre-clean step.
- (4) **PICKLING TANK** - Submerge parts for three (3) seconds. The parts may start to gas, however, this may not be readily noticeable so watch your time very carefully. This step further removes any foreign contamination.
- (5) **FLOWING WATER TANK** - Submerge in tank for three (3) seconds and agitate to flush pickling solution from surface of metal.
- (6) **HOT CLEANER BATH** - Submerge parts in tank for five (5) minutes with operating temperature of 150°. Agitate occasionally to ensure good surface cleaning. **DO NOT** leave in over five (5) minutes or get operating temp. up over 150° F.
- (7) **FLOWING WATER TANK** - Submerge for five (5) seconds and agitate to flush cleaning solution from surface of metal.



- (8) **PICKLING TANK** - Submerge parts for five (5) seconds and agitate. This step, along with the cleaning, will "stimulate" the surface of the metal for plating. Gassing may not occur. Watch your time carefully, and remove in five (5) seconds, with or without gassing.
- (9) **FLOWING WATER TANK** - Submerge for five (5) seconds and agitate to flush pickling solution from surface of metal.
- (10) **NICKEL-ON-BRASS TANK** - Submerge parts in tank for 30 seconds to prepare the surface for nickel plating. This step is very important as it assures bonding of nickel to the brass or copper alloy. If it is missed, or parts are not left in for full time, proper bonding will not occur.
- (11) **FLOWING WATER TANK** - Submerge parts in tank for five (5) seconds and agitate to be sure all D-11, Nickel-On-Brass solution is removed.
- (12) **NICKEL PLATE TANK** - Turn on the heat source and agitation system and bring the plating solution to optimum operating temperature of 195° F. and stabilize. Be sure agitation is started when the heat is first turned on to prevent hot spots in the tank which can cause numerous problems. Next, determine thickness of plate you wish to apply. For optimum results, we consider  $\frac{3}{8}$ -mil. plate best, which will require 45 minutes of submersion in the plating solution. Submerge parts to be plated into plating solution, being sure they do not touch each other, agitator, or sides of tank. Be sure that agitation is thorough and that severe whirlpooling does not develop. Solution must be maintained between 190° and 200° F., with 195° F. optimum. **ONCE THE PIECES ARE IN THE PLATING SOLUTION DO NOT REMOVE THEM UNTIL THE DESIRED LENGTH OF TIME IS UP. IF YOU DO - EVEN FOR AN INSTANT - YOU WILL RUIN THE PLATING JOB AND HAVE TO START OVER!** When the predetermined time has elapsed to plate the thickness desired, remove the parts from the plating solution.
- (13) **FLOWING WATER TANK** - Submerge for a minimum of two (2) minutes and agitate to flush nickel solution from metal surface. There is no maximum time limit in this tank as the nickel plating process has been completed. Remove from tank and allow parts to dry normally or use compressed air for faster drying.



- (14) **INSPECTION** - Check all parts and components carefully to assure an even plate of all desired surfaces prior to assembly. (If a part or component is not nickel plated as desired it **CANNOT** be put back into the nickel tank. The part must be stripped of all nickel and reprocessed from bare metal.) Wipe all parts clean and dry with a soft cloth to remove water spotting or lingering wet areas in holes, etc. If a high gloss finish is desired, you can buff the parts lightly on a loose muslin wheel (6 inch diameter wheel - 1725 RPM.) to bring up the luster, or we had incredible success with the Professional Nickel Final Polishing Cloth. If you wish to use polish on the wheel, use **ONLY** No. 555 White Polish-O-Ray and very light pressure as any form of polishing will remove metal, and you will be removing the nickel plate you just put on. Simichrome can be used to increase the luster of a high gloss finish.

### **SPECIAL NOTES**

#### **Nickel-On-Brass**

As with Nickel Plating on steel, Nickel Plating brass or copper alloy pieces consists of two phases, both equally important. First is the preparation of the metal to enter the plating solution. Since nickel plating on brass is more frequently done in high gloss, proper polishing of the metal is very important. Second is the actual plating of the brass or copper alloy pieces. Any attempt at short cuts in the procedure will result in a poor plating job, wasted time, and material.

Most all the special notes for plating on steel pertain to plating on brass, however, polishing prior to plating brass is even more critical. Every scratch, rough spot, wobble, nick - even a **finger-print** - is highlighted by the plating. It will hide absolutely nothing. So, spend the extra time to clean the parts up and polish them that extra step for the Master Polish Finish required for really good, mirror-bright plating.

Selected cartridge cases such as .38 Spl. and .45 ACP, as well as some .308 Win. & .222 Rem. have been factory plated for years. Now you can plate your brass for longer case life, easier clean up after firing, cleaner primer pockets, etc. However, because of the construction of the belted Magnum case they should **NOT** be plated. Also, never plate primed cases, or loaded ammunition. For best, most consistent results, it is best if new unprimed brass is plated. However, thoroughly cleaned and tumbled brass (when necessary) can be successfully nickel plated.



**IMPORTANT**

Read and understand these instructions and all the labels on the Electroless Nickel Plating chemicals, supplies and equipment. If there is any question about the use of any of these products, please contact the Product Safety Department, Brownells, Inc., Montezuma, Iowa 50171 (515 623-5401) immediately.

**Nickel-On-Brass  
TROUBLE-SHOOTING CHART  
Prior To Plating**

Because the only major difference between plating nickel on steel and plating nickel on brass is the preparation of the metal prior to entering the plating bath, this trouble-shooting chart deals only with the problems that can arise during the pre-plating metal preparation phase. All problems relating to the actual application of the nickel on the brass or copper alloy is covered in the section dealing with the plating problems of plating nickel on steel. Please review that section if your problem is not with the preparation of the metal which is covered here.

**Malfunction****Probable Cause****Remedy****"PEBBLEY" SURFACE**

- |  |  |
|--|--|
| 1. Parts left in D-11, N-O-B Activator too long. | Reduce amount of time parts are in solution. |
|--|--|

**POOR SURFACE ACTIVATION****(Brass Shows No Visible Color Change\*)**

- |  |   |
|--|---|
| 1. D-11, N-O-B Solution depleted.        | Replace D-11, N-O-B solution with new.      |
| 2. *Color change is subtle but apparent. | Do test piece as described in instructions. |

**EXCESSIVE SURFACE ACTIVATION****(Brass turns "tarnished" or dark "aged" color)**

- |   |  |
|---|--|
| 1. Parts left in cleaning solution too long.    | Shorten time, start plating process over from beginning.   |
| 2. Cleaning solution too strong.                | Reduce amount of cleaner. Repolish brass. Return to Precleaning (step 2) and repeat all steps.         |
| 3. Temp. of cleaning solution above 150° F.     | Bring temperature back to 150° F. Repolish brass. Return to Precleaning (step 3) and repeat all steps. |
| 4. Parts left in D-11, N-O-B Solution too long. | Shorten time in tank. Repolish brass. Return to Precleaning (step 2) and repeat all steps.             |



## NICKEL PLATING "SHOPPING LIST"

We have many requests for a list of all the items needed to set up a complete nickel plating operation. Unfortunately, we have trouble with this because we don't know what equipment or supplies you might already have in your shop. However, we did put the three following lists together that incorporate all the supplies and equipment that you need to get set up. In addition, you must have personal safety equipment including chemical face shield, rubber apron, rubber gloves and a breather mask if you wish.

The first list includes the items needed for the basic nickel plating set-up. The second list includes the items required if you plan to use either natural or LP gas as your heat source. The third list is of those items you will need if you wish to use the electric Hot/Stir Plate as your heating and stirring system. (Note: a 1-gallon pyrex container is not all that big, and you will be limited to doing small parts, or 1 - .45 frame and slide or a single 2" barreled revolver at a time in the tank. Much larger batches can be done, of course, in one of the gas-heated porcelain enamel tanks.)

### Basic Electroless Nickel Supply List

- 1) Heavy Duty Rubber Maid Wastebasket
- 2) Heavy Duty Rubber Maid Dishpan
- 3) Nylon or Polypropylene Funnel
- 4) Nylon or Pyrex Measuring Cup Set
- 5) Nylon Spoon
- 6) Electroless Nickel Plating Chemicals, A1
- 7) Electroless Nickel Plating Chemicals, B1
- 8) Electroless Nickel Plating Chemicals, C1
- 9) Hydrochloric Acid, 32% (same as Muriatic Acid, 18° Baumé)
- 10) Distilled Water (available bottled locally)
- 11) Trichloroethane Pre-Cleaner
- 12) Dicro-Clean 909 (8-lb box)
- 13) Bluing Thermometer
- 14) Electroless Nickel Stripper Kit (check instructions to determine Stripper Kit wanted)
- 15) Brown Laboratory Jugs (carton of 4)
- 16) Black Iron Wire
- 17) 12" Stainless Steel Ruler
- 18) Professional Nickel Final Polishing Cloth



### Tanks And Burners For Gas Heat Source

- 1) Porcelain Enamel Tank (Choose size to fit largest job expected)
- 2) Gas Ring Burner for plating tank
- 3) Tank for Hot Cleaner
- 4) Heat Source for Hot Cleaner Tank
- 5) Electric Stirrer/Agitator Motor
- 6) Electronic Variable Speed Controller
- 7) Solution Mixer/Connector Set
- 8) Aluminum Foil to make Heat Shield for motor

### Tanks And Heaters For Electric Hot/Stir Plate System

- 1) Series #1000 Hot/Stir Plate
- 2) Pyrex Gallon Jar (2 required: 1 for Hot Cleaner and 1 for Plating Solution)
- 3) Hot Cleaner Tank (Pyrex on Hot Plate; or Porcelain Enamel Tank or Gas/Electric Heat)
- 4) Heat Source (for Hot Cleaner Tank)

### Getting A Larger Tank

In response to the many requests that we have received for a plating tank of sufficient size to Electroless Nickel Plate both barrelled shotgun and rifle actions, we are providing a list of possible sources for both the High Temperature Polypropylene tanks and the Quartz immersion heaters.

The price for this equipment is quite high and we have not found a source that has a really decent-sized tank. Once you start getting into lengths of 30" and longer, the height and width also increase considerably so you end up with a tank much bigger than you really need. This is the only alternative we have found so far. We are still looking for a company who will make a tank for us in a reasonable size and at a fair price and once we find one we will add it to our line.

For now the list of possible sources for High Temperature Polypropylene Tanks and Quartz Immersion Heaters is as follows: (Please note that there are many other sources available but these are just a few that we found listed in the current **Thomas' Register**).



# **TANKS**

JECO Plastics Products  
P.O. Box 26-T  
Plainfield, Ind. 46168  
317-839-4943

Aetna Plastics Corp.  
17th St. & Clair Ave.  
Cleveland, Ohio 44114  
216-241-6088

Plastic Pipe Systems  
10603 Metric Dr.  
Suite 104  
Austin, Texas 78758  
800-531-5222

United Utensils Co.  
2 Yennicock Ave.  
Port Washington, N.Y. 11050  
800-645-1248

Industrial Plastics  
United States Plastic Corp.  
1390 Neubrecht Road  
Lima, Ohio 45801  
800-737-9724

# **QUARTZ HEATERS**

Proheco Manufacturing Co.  
P.O. Box 3065  
South El Monte, Calif. 91733  
213-686-0687

Protec Technology Inc.  
7265 Commerce Ave.  
Mentor, Ohio 44060  
800-321-3652

N.J. Thermex Co.  
481 Keap St.  
Brooklyn, N.Y. 11211  
212-388-2444

Arklay S. Richards Co., Inc.  
Newton Highlands, Mass. 02161  
617-527-4385

Glo-Quartz Electric Heater Co., Inc.  
2730 E. Walnut Ave.  
Pasadena, Calif.  
213-681-4891  
- or -  
7084 Maple St.  
Mentor, Ohio  
800-321-3574

*- Ralph Walker and The Crew at Brownells*



## CHAPTER 6

### SPRING MAKING & HEAT TREATING



*"A perfect spring. . .and only 973 tries!!"*

#### THE CHARLES ATLAS SECRET?

Did you hear about the gunsmith who exercises religiously? He does one push-up, shouts "Amen", and quits.

- Brad Fenton, Montezuma, Ia.



## HEAT TREATING SMALL PARTS WITHOUT SCALE

I have done some research on the problem of preventing scale while heating small parts and wanted to send along the data on the four different methods which seemed to hold the most hope. The whole idea of my experiments was to find supplies that can be easily obtained and would do a good job of preventing the scale. The items to be tested had to be easily applied and removed, and the method had to be easy so that it could be used in even the smallest gunshop.

Scale is iron oxide and is a result of a reaction between hot steel and air. It doesn't form on steel that is heated in atmospherically controlled furnaces or on steel that is protected from air by another method. Scale starts to become a problem when the steel is heated to about 1000°F. and above (dark red).

(1). One of the older methods of preventing scale is to place the part to be heated in a cast iron pipe, surrounding the part with a non-oxygen, non-volatile material; packing the pipe with a non-oxygen, non-volatile material; packing the end of the pipe with fire clay; and heating the whole thing. Many different materials can be used to surround the part including sand, ashes, slaked lime, bone black and charred leather. Most of these items are easily obtained, and some are relatively inexpensive. Fire clay is the traditional way of sealing the ends of the pipe, but fitted caps can also be used.

Once the outside of the pipe has been brought to the desired temperature, it should be maintained there for a minimum of one hour. The heat must penetrate into the part, and the larger the pipe the longer it takes. Judging the temperature by color is impossible. This method is very difficult and awkward to use where a quench is necessary (imagine yourself trying to unscrew the cap off a pipe that is 1500°F). However, this way is an excellent method to use for annealing since all the material surrounding the part cools very slowly. Be careful when using this method, for the outside of the pipe may only be warm while the parts inside can still be extremely hot. And, if opened too soon, air will reach the part and form scale.

(2). A newer method involves stainless steel foil wrapped around the part. The foil is wrapped around the part like a pouch. All seams must be double-folded, then rubbed with the end of a file handle or wallpaper seam roller to completely seal it. The foil wrap should also conform as closely as possible to the shape of the part to eliminate air from being trapped inside. And a small piece of brown wrapping paper should be included inside with the part. This will ignite and burn all the oxygen out of the trapped air before any scale can form. (A note of caution: the stainless steel foil is only 2-mil. thick and is fairly easy to handle, but the edges



are scalpel-sharp and can easily give a nasty cut.)

Once the part reaches the desired temperature, it can be quenched by removing the foil which is best done by snipping the end off the foil package and pulling the part out with a pair of pliers. This should be done as quickly as possible so that the part doesn't lose its temperature or have enough time to scale. The foil method is very effective at preventing scale, but also prevents you from being able to judge the temperature of the part by its color.

(3). A method often referred to in many of the older books involves the use of Boric Acid. The kink in the Newsletter sent by Maynard Buehler describes it best and works very well. His instructions are: "If small parts, or large ones, are heated to brown to purple, then pushed into a can of Boric Acid powder ( $H_3BO_3$ ), the powder immediately melts, completely covering the part. When re-heated to bright cherry, or whatever, and quenched, it comes out beautifully bright and shining. Now tempering colors can be easily seen, and best of all, no oxidation or scale has occurred." The Boric Acid can be obtained at chemical supply houses and is usually available in packages as small as one pound.

(4). The PBC compound works about the same as Boric Acid and is similar in cost. As with Boric Acid, PBC works best when the part has been degreased first, then heated to around  $500^{\circ}F.$ , and covered with the compound or pushed into a can of it. The PBC forms a thin coating over the part, sealing out the air and preventing scaling or surface oxidation. Once coated, the part can be heat treated as normal.

The PBC compound has a tendency to burn off at temperatures above  $650^{\circ}F.$  as does the Boric Acid. The part can be quenched once the desired temperature is reached, as the residual PBC compound left on the part is easily removed by a wire wheel or by dunking it in boiling water. The PBC compound will leave the metal with a light gray color. The higher temperatures can easily be gauged by color when using the PBC compound, but the lower oxide colors are impossible to see. The best bet would be to use some Tempilaq to make sure of your temperature range.

The PBC compound also has a couple of other advantages: it can be used when a part has to be heated and bent. The foil and pipe methods make this operation impossible to do. Plus the PBC compound can be used inside barrels to prevent scale while silver soldering or welding. Just fill the area in the bore corresponding to the place being worked on outside with PBC using wads to hold the compound in place. A two-pound can of PBC compound lasts a long time since very little compound is lost in covering the parts.

- Douglas Shaeffer, Oklahoma City, Oklahoma

- Maynard Buehler, Orinda, California



## MAGNETIC-CHECK HEAT TREATING

To get the right heat temperature for any steel, heat until non-magnetic and quench. It really works - try it.

- Albert Morse, Elkhart, Indiana

## SPRING HARDENING/TEMPERING TECHNIQUE

Ever try it this way? (I can take no credit. It was given me by an old-time machinist from way back. And, it has worked with an absolute, never-fail monotony for hundreds of springs). I use your spring stock No. 149 exclusively. Shape the spring by grinding, filing, and so forth, until it is a perfect facsimile of the original - which you should be so lucky as to have. Any bending is accomplished by forging with the metal heated to dull red. Drill and tap all holes during this procedure and before hardening. When spring is finally shaped and ready for service, heat to a bright cherry red and immediately quench in raw linseed oil. (The smoke and smell are impressive.) Now polish to high finish. The sparks will fly since the "spring" is harder than an I.R.S. agent's eyes. Take a piece of cast iron. (I don't know why it must be cast, but my advisor insisted on such, and I've been afraid to vary.) The piece I use is about seven inches long, and an inch and a half wide, and a quarter of an inch thick. Play the torch, using a fairly large tip, on the cast iron until it is a brilliant red-yellow color. Lay the spring on the cast iron, turn off the torch and settle down to watch the colors appear on your new spring. When it reaches an iridescent purple-blue color, lift it off and lay it on a piece of scrap wood to air quench. The proof of the pudding is in placing your new spring between the jaws of your vise and flexing it a few times. Mine compress flat and follow the opening jaws every time. A heap of shooting irons are talking out loud in these Pennsylvania mountains with springs made following this procedure.

- Maurice Tompkins, Grand Valley, Pennsylvania

## LEAD POT TEMPERING - REVISITED

After making the springs per the usual methods, polish out all scratches and imperfections, and then heat under a low flame to an even, dull, cherry red and dip in cold water for initial hardening.

Plug in the electric melting pot and fill with lead. Turn dial to desired temperature and allow to sit for ½ hour after all lead is melted.

Dip the repolished spring into molten lead and allow to remain at least 30 seconds, then quench immediately in SAE 20 motor oil. Most of the lead that will stick to the spring will drop off in the oil bath.



A brief session on a wire wheel does the final cleanup, and the spring is ready to install. It really works like a charm!

- John Leonetti, Cody, Wyoming

- Joseph Mozelewski, Burlington, New Jersey

## THE LEAD POT SOAK

When tempering a spring, shape to exact dimensions, then heat to cherry red and quench in water. When thoroughly dry, drop into your lead pot with the lead at 600°F., and soak for 15-20 minutes for small springs, 25-30 minutes for larger ones. Fish out the spring and quench in water. Works great, makes beautiful springs, and absolutely no breakage. (Note: Be very careful that absolutely no water gets into the pot of hot lead. It will turn to super-heated steam instantly and blow hot lead all over you and your shop, causing serious injury. FB.)

- Robert Adelsberger, St. Charles, Missouri

- Floyd Aikman, Lakewood, New Jersey

## IT'S ALL IN THE SPELLING

The typographic error plagues all publications and we've had our share. Even the Gods nod, as witness this gem from the staid New York Times: "Miss O'Hayter has been raising birds for many years and is credited with having the biggest parateets in the state!"

- Ed LaTour, Victoria, B.C., Canada

## TRANSMISSION FLUID QUENCH

A friend of mine who is a fine mechanic, as well as a gun collector, needed a spring for one of his black powder rifles and I gave him a piece of steel from one of your assortments. He had quite a bit of trouble getting the correct temper. The springs he made were either too hard or too soft. He was using 30 wt. motor oil to quench the spring.

On a hunch he opened a can of automatic transmission oil as is used in modern cars. The results are beautiful. The springs tempered in this stuff come out just right every time, as long as you do your part anywheres near correct. I believe it's the way this oil seems to conduct the heat, rather than any special ingredients it may have. Having had trouble myself with tempering springs, I thought that this may be of some help to others.

- Jim Carberry, Placerville, California

## TEMPERING SPRINGS

I would like to make a contribution regarding tempering



springs. I harden the formed spring at approximately 2000°F. and water quench, then soak the hardened spring in molten potassium nitrate (saltpetre), which has a melting point of 750 degrees. I leave the spring in for 15 to 20 minutes and then quench in oil.

I have used this method on many springs, from revolver stop springs to mainsprings for drillings and most recently for an old Remington side-lock double. You will have to be careful while melting the saltpetre after the first time because it solidifies when it cools down and then melts from the bottom up when reheating. It can make like Mt. Vesuvius if you're not careful. I prop an old bolt in the melting pot while still melted and let it harden, then unscrew the bolt which leaves an escape vent for the pressure during the next melting.

*- Jim Schroeder, Ellendale, Minnesota*

### **SPRING TEMPERING - REVISITED**

I tried your "oil can" tempering trick with the springs and find that it works a little better if you mix a tablespoon of lighter fluid into the oil. Makes it light easier, burn better, and gives me a better spring.

*- A. Alexander, Louisville, Kentucky*

### **FOR A SLIGHTLY STIFFER SPRING**

Here's another way to make springs. This way the springs are a little stiffer than the ways told in *Kinks I* and sometimes we wish the springs to give a little more kick. Make the spring as you tell in *Kinks I* and then heat to a bright red all over and quench in pure animal fat without salt in it. Pure lard or bear fat (if you can find it) or sperm oil if you like the smell. With spring red-hot, push it into the quench 'till it just turns a good blue. Pull out, light the oil on it and let it burn off. If done right, it should come out of the quench smoking and will light very easily. I've had real good luck this way on springs I want a little stiffer.

*- Andy's Leather & Sports Shop, Dallas, Oregon*

### **SPRING DRAWING OVEN**

Those little electric toaster ovens are great for drawing metal such as springs and heat coloring. They are quite accurate, you can see the color through the glass front, and after a little tinkering with the thermostat, they will blue at 550 degrees or so. Much better than my big electric furnace or a propane torch for these jobs.

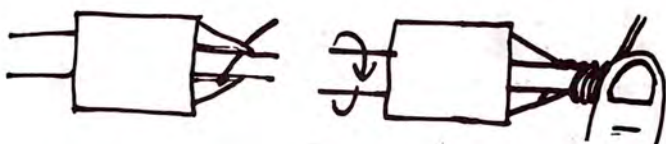
*- Eddie Atkins, Gallipolis, Ohio*

### **WINDING COIL SPRINGS**

Power not required. Chuck a suitable size drill in a drill chuck,



with the drill in backwards - smooth end out. Open jaws slightly and insert end of spring wire between jaw and drill and clamp tight. Most fine wire can be wound by turning chuck using a tough

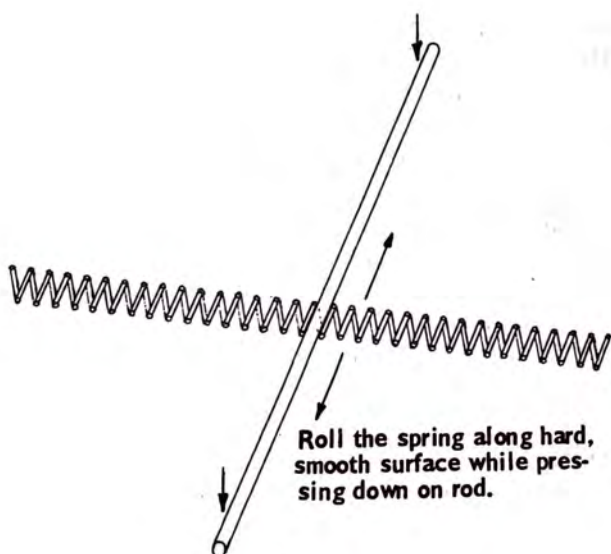


thumb pad. Wind close and stretch out to desired pitch before removing. Every drill or piece of rod makes mandrel - all sizes in your drill index.

- Dan Plamondon, Crescent City, California

### ENLARGING SPRINGS

Ever need a spring badly, but the closest thing was just a bit



too small to work over that pin? It's easy to enlarge the diameter as needed and have a real professional looking spring at the end of it, too - I even doubled the diameter on one once.

- Kenneth Lee Mollohan, Freeport, Pennsylvania

### WHEN ALL ELSE FAILS...

The do-it-yourself expert had re-read the instruction several times but still couldn't assemble his shotgun. Finally, he took all



the parts of his shotgun to the old gunsmith. It wasn't but a few minutes until the old gunsmith had the gun assembled and operating perfectly. "I don't understand," remarked the do-it-yourselfer. "How did you manage to assemble this thing so quickly without the instructions?"

"Well, young fella," replied the old gunsmith, "I didn't have the instructions to read, and when you can't read, you gotta think!"

- Reid Coffield, Montezuma, Iowa

### **O-1 OIL HARDENING DRILL ROD ROUND 1/4" to 3/4"**

**Carbon — .95%      Manganese — 1.20%      Silicon — .25%**

For 1/4" round and larger, we carry oil hardening drill rod rather than water hardening. The O-1 in this size range is characterized by good machinability, smooth finish as well as superior dimensional stability and excellent hardening characteristics. We recommend it for use in dies, tools, parts, and punches. Excellent for general use in the shop.

**HARDENING:** Heat slowly to 1475 to 1525 degrees F. If a controlled furnace is not available, use 1500 Templac. Hold at this temperature for a few seconds then quench in a light quenching oil.

**TEMPERING:** Temper immediately. The following hardness table is for a one hour draw after oil quenching at 1500°F.

<b>Temperature Degrees F.</b>	<b>Rockwell C Hardness</b>
<b>As hardened</b> .....	<b>63-65</b>
<b>300</b> .....	<b>63-64</b>
<b>400</b> .....	<b>61-62</b>
<b>500</b> .....	<b>58-60</b>
<b>600</b> .....	<b>54-56</b>
<b>700</b> .....	<b>51-53</b>
<b>800</b> .....	<b>51-53</b>
<b>800</b> .....	<b>46-48</b>
<b>900</b> .....	<b>43-45</b>

### **W-1 WATER HARDENING DRILL ROD ROUND 1/32" to 1/4"**

**Carbon — 1.00%      Manganese — .40%      Silicon — .20%**

A fine grained commercial quality steel, W-1 can be used for tools, parts, dies or punches which require great hardness and a tough inner core for maximum strength. The sizes we carry should meet 99% of all requirements for pins in guns.

**HARDENING:** Heat the part to 1450 to 1500°F. or slightly higher, up to 1600°F. if unusual depth of hardness is required. If a



furnace is not available use 1450 Templac. Hold at this temperature for a few seconds, then quench in an 8% brine solution. Do not use fresh water! To make a brine solution: Add ¾-lb. of rocksalt to one gallon of water.

**TEMPERING:** Temper immediately. A one hour draw at the following temperatures will produce hardness on the Rockwell C scale as follows:

Temperature Degrees F.	Rockwell C Hardness
As hardened .....	66-67
200 .....	66-67
300 .....	64-65
400 .....	61-62
500 .....	58-59
600 .....	54-55
700 .....	50-51
800 .....	46-47

For spring temper, draw at 650-750 degrees F. for 15 min. You can use a conventional kitchen oven for some tempering. **DO NOT USE A MICROWAVE!** Preheat the oven to the desired temperature prior to inserting the part.

## W-1 WATER HARDENING DRILL ROD FLAT

Identical to the W-1 Round Drill Rod with the same characteristics. Utilize the same hardening and tempering procedures as for the W-1 Round Drill Rod.

- Bob B.

## TOP QUALITY SPRING STEEL

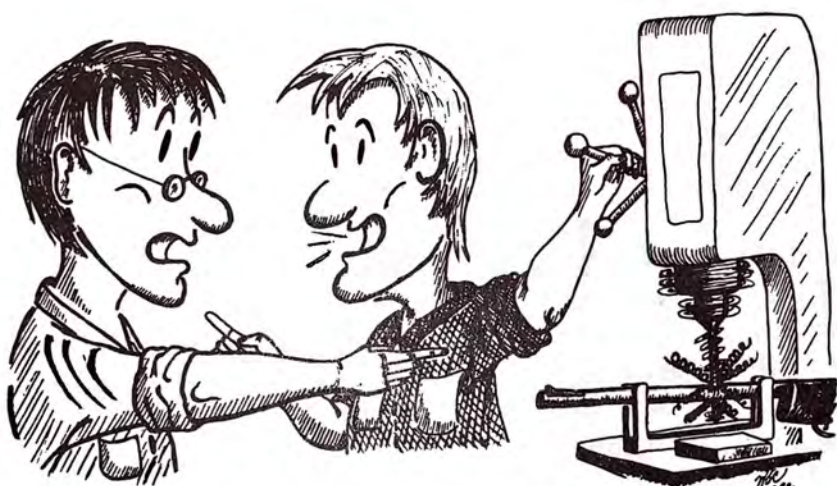
All us nuts working on guns are always looking for good spring stock for making springs. Well, if you live near a RR depot or a company that ships large stuff by rail, pick up the metal straps that they use to bind loads on flatcars. Those straps of steel are the best thing yet for flat springs - and they come in different widths and weights - Fer Free, Too!

- Andy's Leather & Sport Shop, Dallas, Oregon



## CHAPTER 7

# DRILLING & TAPPING



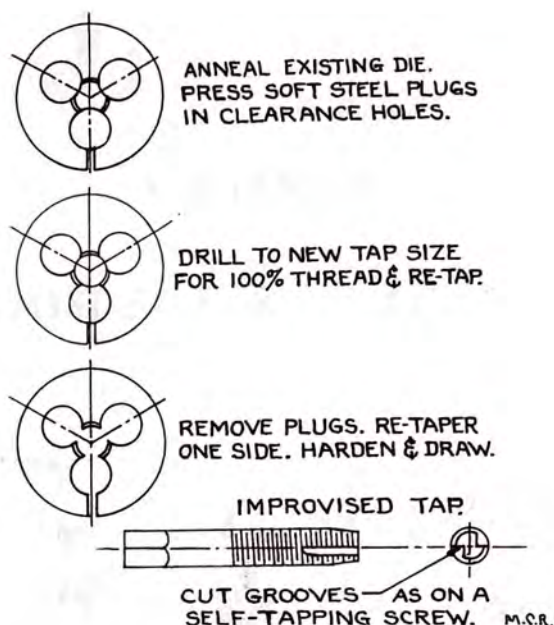
*"And always remember to keep your mind  
on what you're doing!"*

### MAKING SPECIAL TAPS AND DIES

Special, odd-sized taps and dies can be mighty expensive to buy for the few times that you use them. I've found it's very easy to make your own. For the dies, I use a standard inexpensive carbon steel die that will drill out to the required drill size; ie: No. 3, 7, or 7/32 for the involved tap size. Then, plug the clearance holes tightly with soft-fitting steel plugs after first annealing the die. Chuck the die into your lathe, and with the tap of the thread-size you want in the tailstock chuck, retap the blank die to the new size. After that, reharden and retemper the new die and you're ready to go.

I have also made some dies out of solid stock as outlined in Vickery's book *Advanced Gunsmithing*, but it is a lot of work and





I found the above method much easier.

To make special taps to complete a job when the tap is either unavailable or too expensive, I cut the threads on annealed tool steel or drill rod on my lathe, and then grind a self-tapping tip on the end of the tap. Reharden and redraw, and the tap can be used for several jobs before you have to make another one.

*-John Randolph, College Park, Maryland*

## FIGURING TAP DRILL SIZE - EITHER METRIC OR INCH

Having a need for tap drill information for some metric threads, a friend of mine came up with a metric chart. While he and I were studying this chart, he made an observation which we proved OK by experiment and reference.

The size of the tap drill, in millimeters, for a 75% thread can be found by simply subtracting the pitch (in mm) from the major diameter (in mm) and rounding this answer to the nearest actual drill size. . . for example: a 6 x 1.25 mm:  $6 - 1.25$  yields 4.75. The nearest drill to this size is 4.8 mm - the same size as given on the chart.

The system also works in the English system and can be very useful for something like a 1/4x30 thread - an oddball not found on most charts. Here, though, threads per inch must first be converted to pitch, which is done by dividing one inch by TPI. For example, a 1/4x20 thread. One divided by 20 yields .050". .250 (1/4") less .050" gives us .200". The nearest drill to .200" is the #7 - the size



specified in the charts as tap drill for the  $1/4 \times 20$ .  
*- Gordie Mulholland, Streator, Illinois*

### DRILL GRINDING ATTACHMENT IMPROVEMENT

The No. 825 Drill Grinding Attachment does an excellent job of sharpening, but here is an improvement that the maker should have incorporated and maybe you should advise your good custom-



ers to add. A  $3/32 \times 11/16$  drill rod cross pin (I drilled a #42 hole) will keep the  $5/16$  square steel slide rod from pulling out of the frame. On the third drill that I ground, the drill did not advance as I turned the feed screw nut, and I noticed that the feed screw was pulling the frame instead of feeding the drill forward so I disassembled the unit and installed a cross pin to keep the rod in.

*- M. C. Ray, Cleveland, Ohio*

### SETTING DEPTH TO DRILL BLIND HOLES

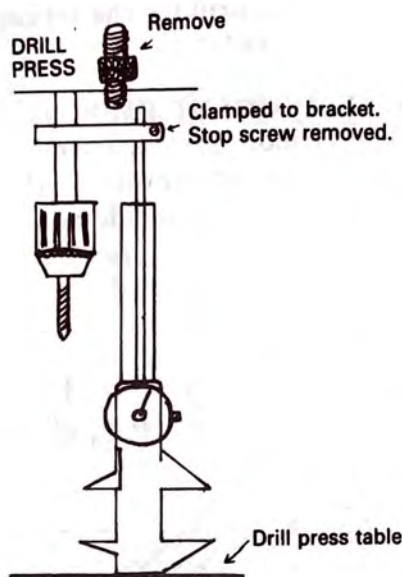
In drilling blind holes, bring the drill down until it touches the work and lock the quill. Then, set the depth wanted on a set of feeler gauges. Lay the feeler gauges on top of the quill stop, and run the stop nuts down against the feeler gauges and lock them. Will give you the exact depth you want with no worry. (You can also use the shank of a number, fractional or letter drill to do the same thing! Frank B.)

*- Roland Beaver, Delta, Colorado*

### DRILL PRESS DEPTH CONTROL

Here is a sketch of a system I use on occasion to do a close



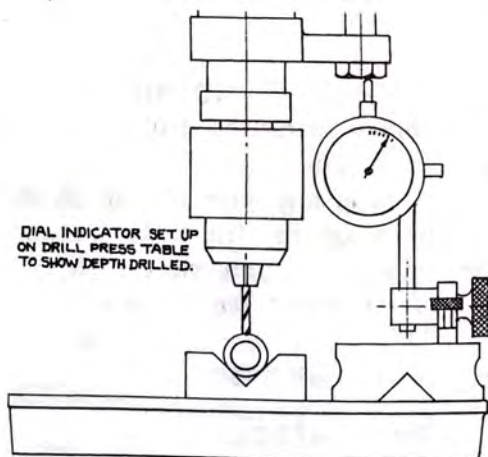


tolerance drilling job on a drill press. I do not have a mill and I find this to be very accurate. I use one of your plastic dial calipers. When head is clamped to table, care must be used so that when the handle is released, travel of drill press does not exceed caliper travel and damage calipers. Other attachment methods can be used, but this is the basic idea.

- Norman Parker, Lemont, Illinois

### PRECISION DRILL PRESS DEPTH INDICATOR

When I have to drill a shallow hole that cannot break through to the bore, I mount this set-up on my drill press. If set-up as



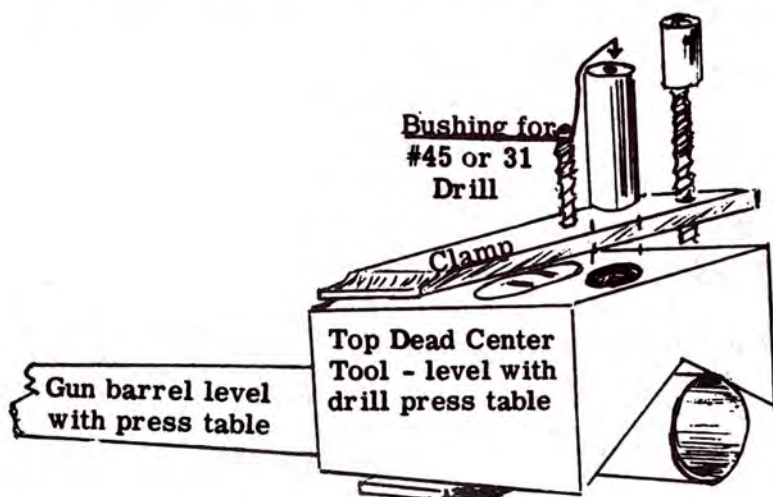


shown you can drill within .015" of the bore without having heart failure.

- Dave Christen, Wadena, Iowa

## DRILLING SIGHT HOLES

When fitted with proper bushings, the Top Dead Center tool becomes an excellent fixture for drilling shotgun sight holes. The



bushings are made from drill stock to take appropriate drills.

To use fixture, level the barrel with drill press table, then install and level the Top Dead Center tool at desired location, select a bushing and drill away. Chuck up the tap and remove bushing while the set-up is still in place.

- Kenneth Hogg, Dothan, Alabama

## THE ASPECTS OF SUCCESS

(This story was told on himself by Ralph Walker, long-time friend and author of some of the best books in the field, during one of the NRA conventions.)

It seems that when first in the army and doing some qualifying shooting, he looked around from his prone position and there stood General Mark Clark in person. Ralph scrambled to his feet and was so scared and nervous that both his knees and salute rattled like snare-drums. The General said something to him, but Ralph was so undone that he couldn't get anything out for tooth-rattles. "Soldier," said the General, "Never be afraid of your superior officers. Just remember this: The further up a tree a monkey may be, the more of his behind you may see..." (Ralph says this quote came originally from General "Vinegar Joe" Stillwell.)

- Ralph Walker, Selma, Alabama



## ALIGNING DRILL & BUSHING

In one of your Newsletters you mentioned using care not to dull the drill flutes when inserting speeding drill into bushing guides. I have found it best to slip the bushing onto the drill which is in the chuck. Lower them both together into the overarm while the drillpress is running. You sure can tell this way if the line-up isn't correct.

- Walter B. Crow, Uvalde, Texas

## SUPER SOLID HOLDING FIXTURES

That TIX Solder is most excellent for pre-aligned assembly of parts to be held together for drilling holes. Just assemble the parts, solder together, then drill, ream, saw, file, tap holes or whatever until you've got everything just like you want it. Then just heat up, take apart and wipe off solder while still molten. I've used it on lots of parts that are impossible to clamp together because of odd shapes - works great!

- George Wilson, Williamsburg, Virginia

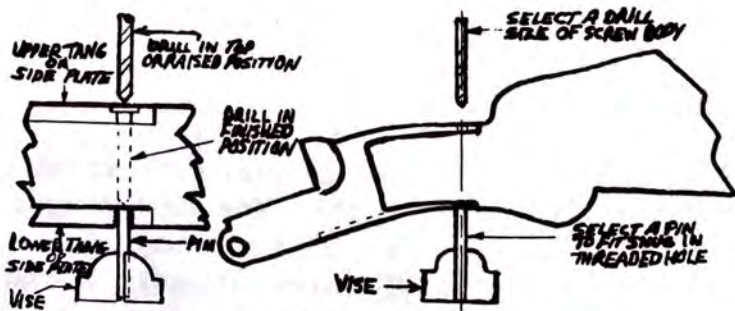
## CORRECTING CROOKED SCOPE MOUNT HOLES

When I get a rifle in that has a scope base off side or tipped because some joker drilled off center, I find I can do a real neat job if the hole is drilled out to a larger diameter and threaded. Then turn and thread a piece of drill rod to fit. Set it with epoxy (Acraglas!) and grind to same contour as receiver. You can then re-drill and thread like it was supposed to be in the first place.

- BL's Gun Sales & Service, Sterling, Colorado

## DRILLING HOLES THAT MEET

This has helped me very much in my stock work and it may help someone else. Most stock jobs require that holes be drilled from one part of a gun to another through the inletted stock. Examples are, holes from one sidelock to another, also holes from up-



THE ABOVE OPERATION CAN ALSO BE DONE WITH A LATHE.



per tang to lower tang, etc. In order that a good job be done, these holes should be as accurate as possible. This is the way I do it. I usually use a milling machine vise in my drill press. This makes it easier to set up. I select and locate a pin in the vise as shown. I then check thickness or depth I need to drill and set depth gage accordingly, being careful that the drill stops short of touching the pin. I then set the side plate or tang threaded hole on the lower pin and proceed to drill hole. The resulting hole should be straight between both pieces and give a very snug fit to the stock when the screw is inserted.

- Charles A. Conrad, Winston-Salem, North Carolina

### **DRILLING HOLES SO'S THEY COME OUT WHERE YOU'RE AIMING**

Make up a center like a center for the tail-stock on a lathe. Make the shank of the "center" to exactly fit the hole in the center of your drill press table and a shoulder above that so that you can slip this center into the hole and have it stay put. The point of the center will meet, exactly with the tip of a drill in the chuck. So, when you want to drill a hole and have it come out right, set the exit point of the hole on the tip of the center and start drilling on the other side... the drill has to come out at the right spot!

- Dave Christen, Wadena, Iowa

### **NITRIC ACID TO GET THROUGH CASE HARDENING**

Take some beeswax and melt a good puddle of it around and over the spot where you want to drill your hole. Then, using a sharp scribe, scribe through the wax to the case hardened surface below exactly where you want the hole. Using a small whiskbroom straw for a brush, put a little drop of strong nitric acid on the spot of steel showing through the beeswax dam. Leave alone for about an hour, which is usually long enough to eat right through the case hardening. If not, rinse off with water and reapply. Sure has saved me lots of wear and tear on the nerves - and pocketbook!

- Donald Powell, Hoquiam, Washington

### **SPOT ANNEALING WITH AN ARC WELDER**

Like most gunsmiths, I spot anneal hard receivers for drilling and tapping the holes for mounting scope bases. But, I've discovered that I can do the job fast and very safely with my arc welder instead of the oxy-acetylene torch.

My technique is as follows: Cut off a 1/2" square headed bolt to 1 1/4" long and grind a slight concave on the head end for better contact with the receiver (try to make the contours match). Then



clamp the bolt in place where you want to spot-anneal with a small "C" clamp. Crank up the welder, and bring the two carbons together, then move them apart to create the arc with the bolt in the arc. This heats up very rapidly, and when turns a bright red (the threaded part of the bolt), remove the arc and let the whole thing cool until it can be removed comfortably with bare hands.

The beauty of this system is the speed with which you can anneal the spot, and it does not discolor parkerizing jobs. And, there is no fire hazard or tank demurrage charges!

*-John Randolph, College Park, Maryland*

## **SURE DON'T WANT HIM TO GET WRONG IDEAS**

The other day a rancher was out by the corral talking with his foreman and remarked that they should get a new bull as they needed some new blood in the herd and that there was to be a bull sale in town the next day. Two bulls he had were standing within earshot and heard the conversation. The older bull remarked to his stand-by that it just didn't make sense to have another bull around as the two of them could handle the 50 cows on hand. "I'm taking care of thirty and damned if I'm going to let him have any of mine." The younger bull said that out of the twenty left there were six or seven that didn't care much for him and he would be willing to give them up, but that was all.

The next day a stock truck drove up to the holding pen and out came the biggest, meanest-looking bull this side of Mexico. He bellowed and snorted and pawed the ground. Man! he was mean. Said the older bull, "You know, I've been thinking it over and decided I'm going to try to get along with this new fella." "Yeah," said the younger bull, "Me, too." Their decision was that he could have the pick of the herd. About that time the newcomer looked through the fence and saw all those beautiful cows and just stuck a horn under the corral fence and tore it up by the roots and headed for the pasture.

The younger bull started off for parts unknown, but the older fellow turned to face the newcomer. The younger bull hollered back at him, "Come on. That big so-and-so will kill you." Replied the older bull, "I know I'm going to get bruised and battered, but I don't want that big SOB thinking I'm one of those cows out there."

*-James Campbell, Mesa, Colorado*

## **DRILLING HARD RECEIVERS**

Polish the areas on the receiver where you want to drill - about the size of a dime. Tin these areas well with soft solder so that



they will conduct heat well for later operations. Get a #1 or larger copper soldering iron such as used by plumbers and cut off the handle. File the tip to a point and then file the point off to slightly larger than the heads of the screws you'll be using. Make the grind slightly concave so that it will fit the contour of the receiver ring.

Lock the soldering iron in the drill press chuck and bring down to contact the spot you want to anneal - where you have tinned. "Dime" size might be too large - about half the size of a dime would be okay. Fix up a weight that you can tie to the drill press handle that will hold the iron against the receiver firmly. With your torch heat the iron red hot. Turn the torch off and walk away from the job. When cool, this system will anneal the toughest of them so that they can not only be drilled but ALSO tapped - and tapping is the real bugaboo. Even makes the toughest Savages drill and tap easily.

- G.B. Chambers, Dallas, Texas

- Ed Moore, Greenville, North Carolina

## SPOT ANNEALING FOR TAPPING HARD RECEIVERS

I swear to goodness I've had this in the Newsletter before but nowhere can we find it. I don't know how many times I've passed it on to you who have written. I got the idea originally from Benny Newman, Agency, Iowa, gunsmith when he worked with me many years ago. Here is the idea: the way matters now stand, it is a simple job to get a hole drilled thru the hard receivers, BUT getting the hole through does not, in any way, anneal or soften the steel to make tapping the hole easier! Here is what you do to anneal the steel for ease of tapping:

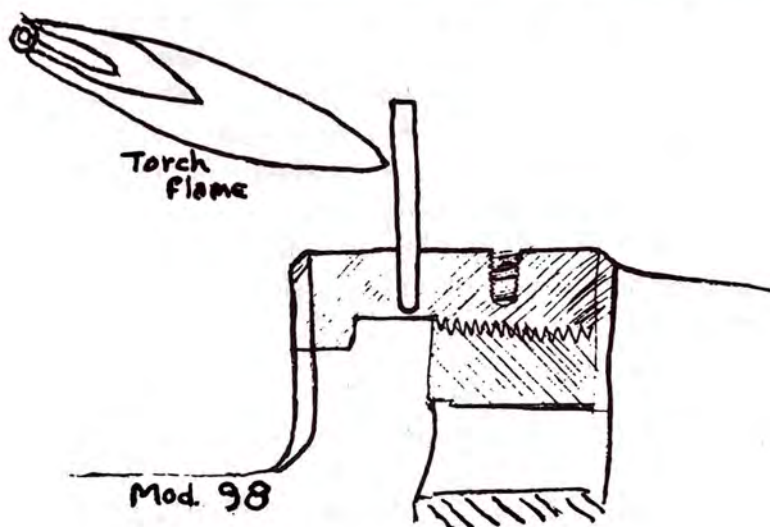
Drill your four holes. Take a piece of abrasive cloth and carefully polish bright an area somewhat smaller than a dime around each hole. With your welding torch turned to a low, "soft" flame, heat the polished area to a blue color. Tip torch out of the way and immediately polish the area back to a bright color and immediately re-heat to a blue color with the torch. Repeat the heating and polishing until the polished area turns blue, rather than staying bright, as you polish. Generally it takes about 4 heatings. This turning blue as you polish with the abrasive cloth means that the metal just in that particular area has reached about 600°F. which is enough to anneal and permit tapping. As only the small area around the hole has been heated, the over-all strength and temper of the action has not been changed. And, because the hole is already there, the heat will follow the hole surfaces - thus permitting the tapping operation.

- Bob B.



## SIGHT SCREW HOLE ANNEALING

A good way to treat a hard receiver is to use a small round-end dentist's burr & lots of Do-Drill at high speed. Once you have the hole, (1/16" approx.), turn an aluminum pin to fit tightly and drive



in. Apply heat to this rod until the metal around the pin begins to turn blue. Go slow and not too much heat. You now have the area around the pin annealed and may drill out with standard No. 31 drill and without danger of spoiling tap as when holes are not annealed all the way to the bottom.

- *The Outdoorsman's Den Ltd., Calgary, Alberta, Canada*

## WAX THAT HOLE

I found that if I light a candle and drip some of the melted wax into the hole drilled for scope mount screws that it taps very easily, and the wax causes the chips to squirt right up and out of the hole. Leaves a beautifully clean hole, and the wax acts as a lubricant, saving any chance of a chip lodging down inside and causing a problem getting the screw to seat properly.

- *Byron Barber, Sedalia, Missouri*

## STP TAPPING COMPOUND

I happened to come across a tapping compound which will take the place of Do-Drill in an emergency. I was working on an experiment for a target shooter and needed a lube for his tap. Unfortunately, I wasn't in my shop where I have lots of Do-Drill, and while looking for a substitute found a can of STP. This stuff is sure as hell sticky, but it did the trick.

- *Wayne Dengler, Danbury, Connecticut*



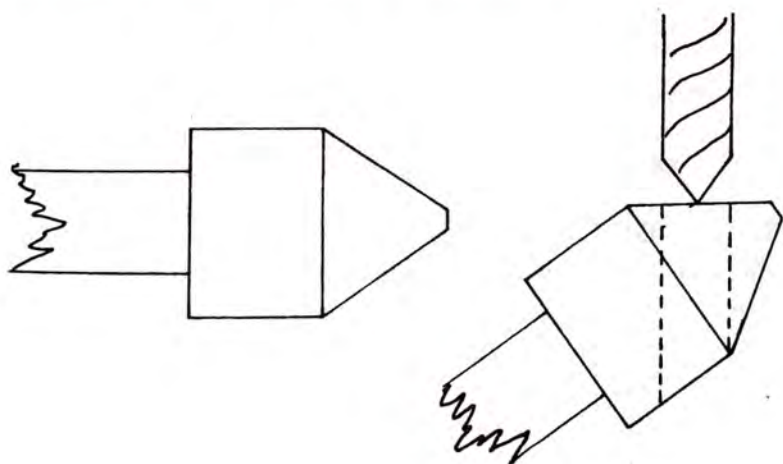
## PERFECT, CHATTER-FREE COUNTERSUNK HOLES

Next time you're ready to countersink a hole, lay two or three patches over the drilled hole, apply cutting oil and bring the countersink tool down for the cut. The cutting edges of the flutes will penetrate the cloth and begin to cut chips as pressure is applied. The patch material will fill in between the flutes to create a cushioning or buffering effect between the tool and the work piece. This buffering, in turn, eliminates the chatter which is the culprit that makes those star-shaped holes we want to eliminate. The exact number of layers of cloth required depends on the flute geometry of the countersink. In general, the more cloth filler, the less cutting action since the cutting edges are contained. The oil is retained in the work area, therefore adding to the tool protection and improving the surface finish. And, you CAN use this method to clean up an already chattered countersunk hole as well as preventing chatter on new ones.

- Bob Miller, Sandy, Utah

## CHATTER FREE COUNTERSINK BIT

A countersink bit which will produce absolutely chatter-free cuts, no matter how heavy the feed, can be made as shown below. Use tool steel. Turn blank with countersink cone of desired angle.



Drill convenient sized hole as shown. (A slot drill in a vertical milling machine is nicest way.) Drill hole at right angle to conical surface. Clean off any burrs with file and/or stone. To harden in one operation, heat to cherry red. Plunge into cold water, straight down, which has  $1/4 - 1/2''$  of non-detergent motor oil floating on the surface, and stir the cutter around until quenched right out. Bit will cut like crazy in steel, aluminum, brass, etc.

- Guy Lautard, West Vancouver, British Columbia, Canada



## USING A SINGLE FLUTE COUNTERSINK

Any machinist worth his salt knows that if you use a single flute countersink at your lowest speed on the drill press there is no way it'll chatter (that I've found yet anyway). If the drill press doesn't go fairly slow, turn by hand, it'll still work.

- *Cliff Kroll, Lanark, Illinois*

## THOSE HONEST YOUNG GUNSMITHS

It seems a gunsmith was looking to hire a new man for the shop, so he decided the best thing to do was to have each man that came in fill out a complete questionnaire. So, he borrowed a handful of them from the personnel officer of a local chain store and had each man complete one before he even talked to him about the job. As he was reviewing one from a very enterprising-looking young man, he was pleased to note that the form was filled out in great detail. Things looked pretty good for the young man, but the real clincher came - and the gunsmith knew he had found his man - when he got to the space on the form to fill in "SEX", and the young man had written, "Yes, once in St. Paul."

(From B.B.: Paul claims this one is true!)

- *Paul Westphal, Austin, Minnesota*

## REMOVING RAISED EDGE ON DRILLED OR TAPPED HOLES

Drilling or tapping holes in barrels and receivers usually raises a small lip above the hole which should be removed. I've found that a 1/4" drill rotated between the thumb and forefingers does a neat deburring job with no danger of marring the finish with a file.

- *Roland Beaver, Delta, Colorado*

## DEBURRING SIGHT MOUNTING HOLES

For deburring sight mounting holes etc., I use a 1/4" round ball milling cutter - like a No. 3 solid carbide - in a hand held chuck instead of a drill, countersink, etc. I've been going to make a permanent handle, but never seem to get around to it. Really does a neat job on number 6's and 8's. Probably could use a bigger size cutter for 10's and up.

- *Lt. Col. F.B. Conway (Ret.), Las Cruces, New Mexico*

## STOPPING REAMER CHATTERING

Take a piece of regular wax paper and wrap the body portion of the chambering reamer with 2 thicknesses of wax paper from the edge of the front shoulder up the reamer a little past the point on the reamer that is going to be the mouth of the chamber when the chamber is to full depth. Does a beautiful job of eliminating



that ever-so-popular chamber reamer chatter.  
*- Lyle Laurvick, Superior, Wisconsin*

### **FREEZE OUT THOSE STUCK-'UNS**

I was trying to get one last thread on an '03 Springfield receiver with a tap that I knew was getting dull. I got almost to the bottom and the tap or the receiver, I don't know which, said "Eeeek", and that's all there was. The tap was stuck solid in the hole and I tried everything I could think of to back it out with no luck.

Finally, had a little brain storm; bored a hole in an ice cube just large enough to slip the cube over the tap. Dropped a fiber washer over the tap first and then slipped the cube on. I let the cube sit there for a minute or so and then backed the tap out just like it was brand new.

*- Don Houston, Oakhurst, California*

### **"BREAK-AWAY" TAPS FOR EASY REMOVAL**

In all these years, I've never had a tap break at any point except in the fluted portion. If you're tired of working up a broken tap out of the hole the hard way, try this suggestion. I take all of my taps and place them in the lathe chuck and with my tool post grinder, cut a groove into the round shank about midway between the fluted area and the square top. The contour of this groove is of little importance - it can be triangular, with a radius, whatever way you want to grind it - just be sure the groove is deep enough to leave a cross-sectional area on the shank that is smaller than any portion of the fluted area. Now, any breakage of the tap will occur at this "break-point" leaving you a nice stub to grab, making removal of the broken tap much faster and easier.

*- Edward Hagan, Tucson, Arizona*

### **BROKEN TAP REMOVAL**

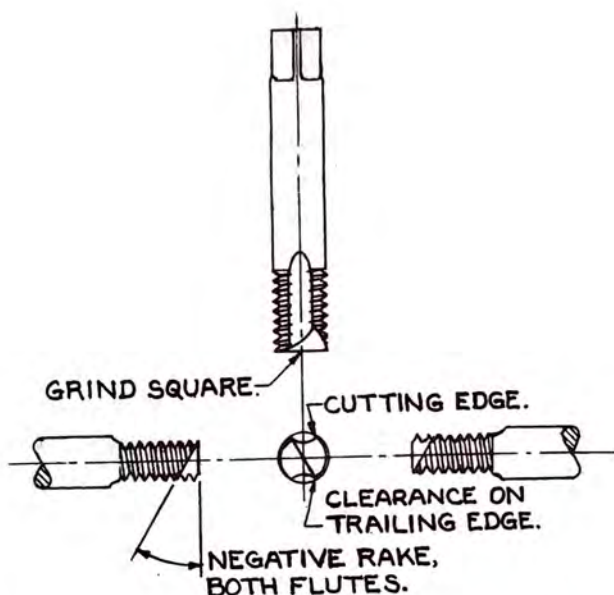
I always use my miniature torch to remove broken taps from screw holes: (WITH GOGGLES ON) when you see the tap start to get hot enough to burn, turn off the acetylene and the oxygen will blow the burned tap right out. This way will work on either high speed or carbon taps... makes no difference... blows them all right out.

*- Doc Carlson, Crofton, Nebraska*

### **REWORKING BROKEN TAPS**

When a tap has worn out or breaks, I grind it off to about 1/4" long to get to a new sharp portion of cutting teeth. I then grind





this short tap with a reverse rake, like grinding a drill bit with a negative rake. This gives me short cutting teeth at the tip of the tap for starting into the hole yet leaves the rest of the tap with teeth to cut at full depth.

- W.A. Young, King of Prussia, Pennsylvania

### WHAT'S THE USUAL, YER HONOR?

The young Judge was very knowledgeable about law, yet he wanted to be sure that his rulings were in keeping with those of his predecessor. This was especially evident when a bootlegger was brought before him. Since he had no idea what would constitute a proper fine, he recessed the court and hurried to his office. There he telephoned the old retired Judge he had replaced and asked him, "I've got a bootlegger here. What should I give him?" "I never gave a penny more than \$5 per quart!", replied the old Judge.

- Bob B.

### REMOVING BROKEN HIGH SPEED TAPS

Just go to your local dentist and get all the tiny burrs he's about to throw away - the ones that are gold colored or have gold bands are the ones you want. Carbide, I think. To remove the broken tap, chuck the burr into your high-speed hand grinder and run the burr down along the side of the tap in one of the flutes AFTER you turn the grinder on. Stroke it up and down in the flute. It will cut clean through the tap with nary a scratch to the new threads. I've used this method now for some time and never failed to get the broken tap out in about 3 minutes or less. Of



course, you will break quite a few of these little burrs when you put too much pressure on them sideways but, what the hell, you got them free to begin with!

- *Ed Budd, El Paso, Texas*

## **DRILLING OUT A BROKEN TAP**

Another use for the Forster drill jig, which has made me a confirmed follower of this method of scope mounting, is the removal of broken taps. If a tap is broken, and some are sure to be if you try to tap all actions and refuse to anneal the receiver rings, you have merely to set the stop for the bushing carrier (if it is not already set) remove the carrier and break off the tap as squarely as possible. Replace the carrier, and, using the tap size drill, proceed to drill out the broken tap. You must, of course, use a carbide drill and the proper bushing. It does require a bit of care to get the drill started unless the broken end of the tap is nearly square; but, if the set-up is made with the end of the bushings as close to the work as possible, this system works. It has worked for me so many times that I now make just one try with the broken tap extractor before resorting to the carbide drill.

- *Dale Wise, San Antonio, Texas*

## **MAGNA-TIP OUT STEEL CHIPS**

I was trying to get all the steel chips out of a deep recess, and not having much luck. I sat back to cuss for a minute, and noticed that the Magna-Tip screwdriver lying on the bench had steel chips stuck all over the bit in it. So - I grabbed up the handle, put in a long skinny bit that would go down into the recess, and stuck it down in the hole. It came out with almost all the chips stuck to it on the first try. Used it 3 or 4 more times, cleaned the chips off after each time, and the job was done.

- *Art Carlson, Columbia Falls, Montana*

## **TEFLON TAPE THREAD TIGHTNER**

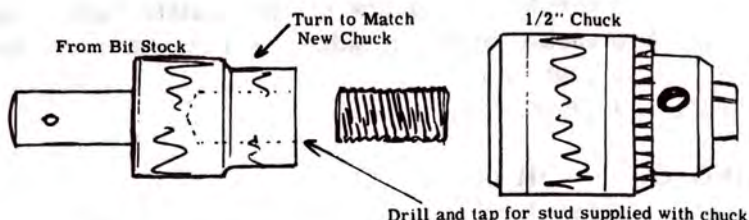
A wrap of teflon tape, such as that used for sealing pipe joints, will keep the larger sizes of coarse threads from jiggling loose. This is a special help when it's not possible to use a jam nut or lock washer.

- *Charlie Elzi, Sedalia, Colorado*

## **ROUND ADAPTOR CHUCK FOR "BRACE & BIT" STOCK**

How many times does the gunsmith wish for some means to put a good bit of controlled power for drilling, reaming, etc.! The good old bit stock (Out here in Iowa we call 'em "brace-'n-bit"- BB.)





is just right, power and control-wise, but just about all our tools have round shanks! I have clamped a 1/2" drill or reamer with round shanks in that chuck designed for a tapered, square shank but it is a slip-shod system. I had an old bit stock that I bought in 1938. It was not worn out, but I felt that I would modify it and not a new one. So, I knocked out the retaining pin through the ratchet and took the chuck assembly out and apart.

I cut the end off, drilled and tapped it for 1/2 N.F., put some Locktite on the stud and screwed on a 1/2" chuck. As 99% of your work will be done in a forward direction I felt that the Loc-tite would take care of the other 1%. The chuck I used is a Rigid B-14-B and came complete with key and a 1" long stud from a local hardware. I could not tell you all the uses that I have put it to, but it gets used 100 to 1 over the standard model.

The remaining part of the chuck base can be turned to match the rear of the key chuck like shown above.

- Lt. Col. F.C. Conway (Ret.), Las Cruces, New Mexico

## REPLACEMENT PINS OUT OF OLD DRILLS

Save those old drill shanks that are in good shape for use as replacement pins. Strangely enough, you will find that many of them do actually fit, and besides it's an easy way to check the exact size of the hole by reading the markings off the end of the drill shank.

- Tom Robinson, Baltic, Connecticut

## IN THE INTEREST OF SCIENCE

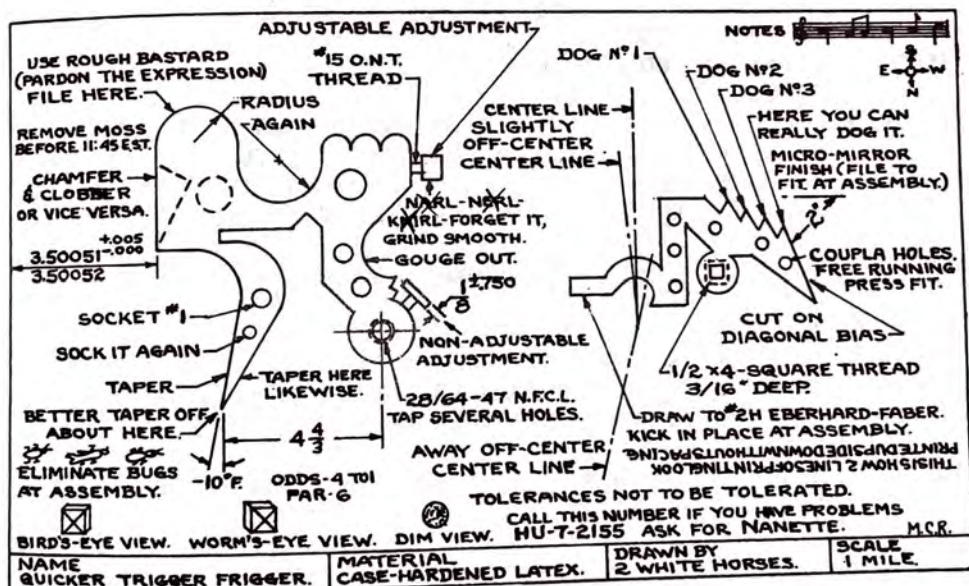
We have a retired gunsmith here that some might consider to be the laziest man in the county. However, I know for a fact that this is not true. Just yesterday, he told me that he is currently conducting a highly scientific experiment with his front porch rocking chair to determine if it's easier to rock north and south with the wind, or east and west with the grain of the floorboards!

- Bob B.



## CHAPTER 8

# "PRIVATE LABEL" & CROSS-REFERENCE CHARTS



## REMINGTON INTERCHANGEABLE PARTS

All of us in the trade owe a big debt to F. T. Millener, Manager of Consumer Service, and Remington Arms for permission to reprint this chart. It can be a real money - and life - saver by reducing the number of parts you need to stock; or by making emergency repairs possible on many of the older models.

Part No.	Part Name	Models Used On
20616	Butt Plate—M/1100, 870, 11-48, 58, 878, (all gauges)	
17578	Butt Plate—M/550, 581, 582, 591, 592, 514 Reg.	
14472	Butt Plate—M/742, 760, 700, 740	
18757	Carrier Dog—M/11-48 (28-410 Ga.)	



Part No.	Part Name	Models Used On
15480	Carrier Dog—M/1100, 878, 870, Spts '58 (all gauges) 11-48 (12-16-20 Ga.)	
17017	Ejector—M/700, 721, 722, 725, 660, 600 (all calibers except 222 and 223)	
15852	Ejector—M/700, 760, 660, 600 (222 and 223 calibers)	
17676	Ejector Pin—M/700, 721, 722, 725, 660, 600	
17019	Ejector Spring—M/700, 721, 722, 725, 660, 600, 760 (222 Cal.)	
25431	Ejector—M/870 Spts '58, 878 (12 Ga.)	
24446	Ejector—M/870 Spts '58 (16 Ga.)	
24447	Ejector—M/870 Spts '58 (20 Ga.)	
16176	Extractor—M/1100, (12-16-20 & 20 LW, LT—20), M/870 11-48, Spts '58 (12-16-20 Ga.) 878	
14441	Extractor—M/1100, 870 (28 Ga.)	
16254	Extractor—M/740, 742 (all calibers) 760 (all calibers except 222 and 223)	
14669	Extractor—700 (all calibers except 222 and 222 Remington Mag- num) 788, 22/250, 308, 243, 6mm	
15850	Extractor—M/760 (222 cal.) 700, 222, 222 Rem. Mag., 223 cal., 788, 222 Cal., 600, 660, 222 Cal.	
15709	Extractor—M/700 (7mm, 264, 30-06, 350 Rem. Mag.) 660 (6.5 Rem. Mag., 350 Rem. Mag.) 600 (6.5 Rem. Mag., 350 Rem. Mag.)	
17432	Extractor Plunger—M/1100 (12-16-20-20LW, LT-20 Ga.) 870 (12-16-20-28 Ga.) Spts '58 (12-16-20 Ga.) 878 11-48 (all gauges)	
14742	Extractor Plunger—M/870, 1100 (410 Ga.)	
17433	Extractor Spring—M/1100 (all gauges) 870 (12-16-20-28 Ga.) Spts '58 (all gauges) 878	
18822	Extractor Spring—M/11-48 (all gauges)	
14806	Extractor Spring—M/870 (410 Ga.)	
17436	Firing Pin—M/1100, 11-48, Spts '58, 878, 870 (all gauges)	
17437	Firing Pin Ret. Spring—M/11-48 (all gauges) 870, Spts '58, 878 (12-16-20 Ga.)	
15702	Firing Pin Ret. Spring—M/1100 (all gauges) 870 (28-410 gauges)	
18623	Firing Pin Ret. Pin—M/1100, 870, Spts '58 (12-16-20 Ga.) 878, 11-48 (all gauges)	
14297	Firing Pin Ret. Pin—M/1100 (28-410-20LW, LT—20) 870 (28-410 gauges)	
23805	Front Sight—M/740, 760, 721, 722, 870, 1100 RSS	
15373	Front Sight—M/700, 660	
18749	Hammer—M/11-48 (all gauges), 870, Spts '58 (12-16-20), 878	
18339	Hammer—M/740, 742, 760	
15249	Hammer—M/1100 (12-16-20 Ga.)	
14295	Hammer—M/1100 (28-410-20LW, LT-20), 870 (28-410)	
22790	Inner Mag. Tube Assembly—M/572, 552	
26470	Inner Mag. Tube Assembly—M/Nylon 12 and 512X	
22325	Locking Block—M/878, Spts '58, 870 (12-16-20 Ga.)	
29920	Locking Block—M/870 (28-410 Ga.) 1100 (28-410-20LW)	
21880	Magazine Clip—M/740, 742 (30-06)	
23737	Magazine Clip—M/740, 742 (308 Cal.)	
21882	Magazine Clip—M/740, 742 (280 Cal.)	
17034	Receiver Plug Screw—M/740, 742, 760, 700, 660, 721, 722, 600, 725	
18551	Receiver Stud—M/742, 760, 870, Spts '58, 878	
25115	Safety—M/1100, 870, 11-48, 878, Spts '58 (all gauges), 742, 760, 572, 552, 740	



Part No.	Part Name	Models Used On
18750	Sear—M/1100, 870, 11-48, 878, Spts '58 (all gauges), 742, 760, 740, 572, 552	
19993	Stock Bearing Plate—M/11-48 (12-16-20 Ga.) 1100, 870, Spt '58, 878 (all gauges)	
19621	Stock Bearing Plate—M/11-48 (28-410 Ga.), 740, 742, 760	
20610	Trigger Assembly—M/1100, 870, 11-48, Spts '58, 878 (all gauges), 740, 742, 760, 572, 552	
20601	Trigger Plate Pin Front—M/870, 1100, Spts '58, 11-48 (all gauges), 878	
20606	Trigger Plate Pin Rear—M/870, 1100, Spts '58, 11-48 (all gauges), 878	
20602	Trigger Plate Pin Front—M/1100 (28-410-20 LW, LT-20) 870, 11-48 (28-410 Ga.) 740, 742, 760	
20607	Trigger Plate Pin Rear—M/1100 (28-410-20LW, LT—20) 870, 11-48 (28-410 Ga.) 740, 742, 760, 552, 572	

### "PRIVATE LABEL" CROSS-REFERENCE CHARTS

#### ALDENS

**Aldens Model**  
Chieftain 670

**Manufacturer's Equivelant Model**  
Savage 67 or Springfield 67

#### BELKNAP

##### Belknap Model

B-63  
B-63E  
B-64  
B-65C  
B-68  
B-68D  
B-963  
B-964  
B-967

##### Manufacturer's Equivelant Model

Savage 947-B, Springfield 947  
Savage 940E  
Savage 67, Springfield 67  
Savage 745, Springfield 745  
Savage 94C  
Savage 94D  
Savage 120, Springfield 120  
Savage 87J  
Savage 87N

#### CANADIAN INDUSTRIES LTD.

##### Canadian Industries Model

212  
227  
233  
266  
607  
607-TD  
621  
621-TD  
710  
725  
830  
871  
950  
950C  
950D

##### Manufacturer's Equivelant Model

Savage 7J  
Stevens 87J  
Savage 85N  
Springfield 187  
Springfield 67  
Savage 30  
Savage 30  
Savage 30D  
Savage 311  
Savage Fox BDE  
Savage 340  
Savage 170  
Savage 110  
Savage 110C  
Savage 110D



**COAST TO COAST****Coast to Coast Model**

40  
42  
180  
182  
184  
267  
267  
285  
286  
288  
320  
367  
650  
843  
843-2DS  
843-3DS  
946  
946E  
946Y

**Manufacturer's Equivelant Model**

Marlin 99C, Glenfield 60  
Marlin 989M2, Glenfield 70  
Stevens 18D  
Springfield 18S  
Savage 951, Springfield 951  
Stevens M77C  
Stevens 77  
Savage 7J  
Stevens 46  
Stevens 87J  
Springfield 120  
Savage 30  
Marlin 55, Glenfield 50  
Savage 340, Springfield 840  
Savage 340 (.222)  
Savage 340 (.30-30)  
Stevens 940, Springfield 947  
Stevens 940E  
Stevens 940Y

**COTTER AND COMPANY  
(Westpoint or Trutest)****Cotter Model**

10-40  
33  
60-50  
75-45  
121  
121  
167  
168  
168  
287  
410  
424  
434  
474  
487-T  
645  
645-C  
842  
911  
918  
948  
948-E  
949  
949-C  
949-Y

**Manufacturer's Equivelant Model**

Marlin 101, Glenfield 10  
Marlin 336C  
Marlin 99C, Glenfield 60  
Marlin 99M1, Glenfield 75  
Stevens 15  
Stevens 120  
Springfield 67  
Savage 30  
Springfield 67-VR  
Springfield 87-J  
Savage 110  
Savage 24  
Savage 34  
Savage 170, Springfield 174  
Springfield 187  
Savage 745  
Springfield 745-C  
Springfield 840  
Springfield 511  
Springfield 18  
Stevens 940  
Savage 948-E  
Springfield 944  
Savage 94C  
Springfield 944-Y



## CRESCENT FIREARMS

The most prolific of all manufacturers of brand name guns, this company was founded in the late 1880's in Norwich, Conn. In 1893 it was purchased by H & D Folsom Arms Co. of New York. As a major importer and wholesaler of firearms, Folsom sold guns produced by Crescent under a variety of names. In fact, you could have almost any name you wished stamped on the gun you bought! Eventually, H & D Folsom was taken over by Savage Arms Corp. in 1931.

This should, by no means, be considered the definitive listing of names used by Crescent Firearms. There could well be many more!

American Gun Co.	Mohawk
Barker Gun Co.	Monitor
Bellmore Gun Co.	National Arms Co.
Carolina Arms Co.	New York Arms Co.
Central Arms Co.	New Rival
Cherokee Arms Co.	Nitro Bird
Chesapeake Gun Co.	Nitro Hunter
Compeer	Norwich Arms Co.
Crescent Firearms Co.	Not-Nac Mfg. Co.
Cruso	Oxford Arms Co.
Columbian New York Arms Co.	Peerless
Cumberland Arms Co.	Perfection
Elgin Arms Co.	Piedmont
Elmira Arms Co.	Pioneer Arms Co.
Empire	Quail
Empire Arms Co.	Queen City
Enders Oak Leaf	Rev-O-Noc
Enders Royal Service	Richter, Charles
Essex	Rickard Arms Co.
Faultless	Royal Service
Faultless Goose Gun	Rummel
Forbes, F.F.	Shue's Special
Hartford Arms Co.	Southern Arms Co.
Harvard	Special Service
Hermitage Arms Co.	Spencer Gun Co.
Hermitage Gun Co.	Sportsman
Howard Arms Co.	Springfield Arms Co.
Interstate Arms Co.	Square Deal
Jackson Arms Co.	State Arms Co.
Kingsland Special	Sterling
Kingsland 10 Star	Sullivan Arms Co.
Knickerbocker	U.S. Arms Co.
Knox-All	Victor
Lakeside	Victor Special
Lau & Co., J.H.	Virginia Arms Co.
Leader Gun Co.	Volunteer
Lee Special	Vulcan Arms Co.
Lee's Munner Special	Wilshire Arms Co.
Marshwood	Winfield Arms Co.
Massachusetts Arms Co.	Winoca Arms Co.



**CRESCENT FIREARMS — Continued**

Metropolitan  
Minnesota Arms Co.  
Mississippi Valley Arms Co.

Wolverine Arms Co.  
Worthington Arms Co.

**H & D FOLSOM ARMS**

In the early 1890's, H & D Folsom, located in New York, purchased both the Bacon Arms Co., as well as Crescent Arms. Folsom produced vast numbers of firearms in the United States with these companies as well as importing firearms from Europe, primarily Belgium. Many of the brand names used by Crescent Arms are listed elsewhere. The listing below consists primarily of those arms which were imported by Folsom. The firearms that were produced in Europe are readily identifiable since they are stamped with the appropriate official proof marks. It is important to remember that most of the firearms listed below were produced in Belgium and will bear Belgium proof marks.

Baker Gun Company  
Barker, T.  
Bonhill, C.G.  
Franklin, C.W.  
Harrison Arms Co.  
Henry Gun Co.  
Hummer  
Liege Arms Co.  
Manton & Co., J.  
Mt. Vernon Arms Co.  
Moore & Co., Wm.  
C. Parker & Co.

Richards, W.  
St. Louis Arms Co.  
Sickels Arms Co.  
Stanley  
Ten Star  
Ten Star Heavy Duty  
Tiger  
Warren Arms Co.  
Wilkinson Arms Co.  
Wilmont Arms Co.  
Wiltshire Arm Co.

**GAMBLE SKOGMO INC.  
(Hiawatha)****Gamble Model**

130  
189J  
189N  
521  
567  
594  
587  
594Y  
1300

**Manufacturer's Equivelant Model**

Savage 30  
Stevens 87J  
Stevens 87N  
Stevens 120  
Springfield 67  
Springfield 944  
Stevens 187  
Springfield 944Y  
Springfield 67VR

**GLENFIELD****(made by Marlin Firearms Company)****Glenfield Model**

10  
20  
25

**Manufacturer's Equivelant Model**

101  
80  
80 w/swivels



**Glenfield Model**

30A  
35  
50  
60  
65  
70  
75

**Manufacturer's Equivelant Model**

336  
336 .35 Cal. w/Birch  
55  
99C  
99M-1  
989M2  
989M-1 less handguard

**HARRINGTON & RICHARDSON**

In addition to firearms produced for Sears, Montgomery Ward and other large retailers, Harrington & Richardson has produced firearms under the following brand names:

Aetna  
Bay State

Thames Arms Co.  
U.S.R.A.

**HOOD FIREARMS COMPANY**

Very little is known about this company which was established in the mid 1870's in Norwich, Conn. It is known to have produced arms under the following brand names:

Alaska

Alexis

**HOPKINS AND ALLEN**

A major producer of firearms in the U.S. during the 19th Century; this company was formed in the late 1860's. It continued in business until 1915 when it was purchased by the Marlin-Rockwell Corp. As with many other companies of this type, it was located in Norwich, Conn. Most of the firearms produced were marketed under its own name, Hopkins and Allen. It also is known to have produced firearms under the following brand names:

Allen

XL

**IVER JOHNSON**

Although Iver Johnson, who immigrated from Norway in the 1860's, was involved in firearms manufacturing almost from the moment he arrived in the United States, it was not until 1883 that the Iver Johnson Company was established. During the later part of the 1800's and up until World War II, this company produced a great number of firearms under both its own name as well as assorted brand names. A tremendous number of handguns were produced stamped only with names such as American Bulldog, Encore, Favorite, Defender and Eagle. In addition, rifles and shotguns were marketed under names such as the following:

Champion  
Excel

Hercules  
Simpson



**FRANK M. KATZ****Katz Model**

F-1282

F-1287

**Manufacturer's Equivelant Model**  
 Marlin 989M2, Glenfield 70  
 Marlin 55, Glenfield 50

**MARLIN FIREARMS CO.****New Model**

780

781

782

**Equivalent Old Model**

80

81

980

**OKLAHOMA TIRE & SUPPLY CO.****(Otasco)****Otasco Model**

30

65

**Manufacturer's Equivelant Model**  
 Marlin 336, Glenfield 30A  
 Marlin 99C, Glenfield 60  
 w/brass outer tube

**J. C. PENNEY CO., INC.****J. C. Penney Model**

2025

2035

2066

2935

3040

4011

6400

6610

6630

6647

6660

6670

6870

6870H

**Manufacturer's Equivelant Model**

Marlin 80C

Marlin 80, Glenfield 20

Marlin 49DL

Marlin 336

Marlin 336, Glenfield 30A

High Standard Flite King

Savage 340

Stevens 120

Marlin 55, Glenfield 50

Springfield 944

Marlin 99C, Glenfield 60

Springfield 67H

Savage 30

Savage 30H

**SAVAGE - STEVENS ARMS CO.**

In 1894 this company was founded by Arthur W. Savage as the Savage Repeating Arms Co. Later, in 1915, it was sold to the Driggs-Seabury Ordnance Co. After World War I, the company name was changed to the Savage Arms Corp. Unlike most arms manufacturers, the company was in very good financial condition following the close of World War I and in 1920 it purchased the J. Stevens Arms Company. This was followed by the acquisition of the Page-Lewis Arms Company in 1926, Fox Gun Company and Davis-Warner Arms Corporation in 1930. Crescent Firearms Co. was also purchased during this period. Today Savage is probably the most prolific producer of firearms for other companies such as



**SAVAGE- STEVENS ARMS CO. — Continued**

Sears, Coast-to-Coast, and Western Auto. The following names, among others, have been used by Savage:

Davis	Quail
Eastern Arms Co.	Stevens
Empire	Springfield
Knickerbocker	Virginia Arms Co. Leader
Peerless Gun	

**SEARS, ROEBUCK & COMPANY**

In 1905 Sears, already a well established mailorder house, organized the Meridian Arms Company, in Meridian, Conn. Firearms were produced primarily for sale by Sears itself. The manufacturing plant was sold to New England Westinghouse in 1916 and machinery was sold to another company.

A few of the brand names used were as follows:

Aubrey, A. J.	Sam Holt
Meridian Arms Co.	Eastern Arms
Colton Firearms Co.	Empire State Arms
Fryberg and Co., Andrew	Federal Arms

Since the period after World War I, Sears has contracted with various arms manufacturers to produce sporting arms to be sold under the Sears label. The most frequently encountered brands or model designations used by Sears are J. C. Higgins and Ted Williams.

<b>Sears Model</b>	<b>Manufacturer's Equivalent Model</b>
2C	Winchester 131
18AC	Savage 18C
18	Mossberg 183K
20	Early High Standard Pump (Unknown)
21	Late High Standard Pump (Unknown)
M30 Pump (Ranger)	Stevens M520
31	High Standard Model A-1041
33	High Standard Model P-1011
41	Marlin 101
41DLA	Marlin 122
42	Marlin 80
42DL	Marlin 80
42DLM	Marlin 980
43	Marlin 81
43DL	Marlin 81
44DL	Marlin 57
44DLM	Marlin 57M
45	Marlin 336C
46	Marlin 56
46DL	Marlin 56



## SEARS, ROEBUCK &amp; COMPANY — Continued

## Sears Model

## Manufacturer's Equivalent Model

53	Savage 110
54	Winchester 94
73	Savage 73
97	Savage 94
97-AC	Savage 94-AC
98	Springfield 944
101.7	Stevens 311
101.7C	Stevens 311-C
101.16	Stevens 87; Savage 6
101.25	Stevens 59
101.40	Savage 947-947Y, Stevens 940-940Y
101.100	Savage 96-96Y
101.1120	Stevens 51, Springfield 951
101.1380	Stevens 58, Springfield 18
101.1610	Savage Fox BDL
101.1701	Savage Fox BDE
101.1701-C	Savage BSE
101.2830	Savage M73
101.52772	Savage 65M
101.5350	Stevens M58
101.5350	Springfield 18
101.5350-D	Stevens 18D
101.5350D	Stevens 58D
101.53521	Savage 340
101.5380	Savage 18AC, 18
101.5380D	Stevens 18DAC
101.5410	Stevens 58, Springfield 18
101.5410D	Savage 18D, 18DS, Springfield 18DS
102.25	Stevens 520A
103.2	Marlin 80
103.13	Marlin 81
103.16	Marlin 80
103.18	Marlin 100
103.181	Marlin 101
103.228	Marlin 80
103.229	Marlin 81
103.273	Marlin 980
103.274	Marlin 122
103.350	Marlin M90
103.360	Marlin 90
103.450	Marlin 336
103.451	Marlin 336
103.720	Marlin 59
103.740	Marlin 59
103.1977	Marlin 101
103.19780	Marlin 101
103.19790	Marlin M80
103.19790	Marlin 80
103.19800	Marlin 80



**Sears Model**

103.1981  
 103.1982  
 103.19820  
 103.19840  
 103.19880  
 103.19890  
 103.2751  
 103.2840  
 103.2850  
 103.2870  
 200  
 234  
 300  
 583.1  
 583.13  
 583.14  
 583.15  
 583.16  
 583.17  
 583.18  
 583.2  
 583.20  
 583.21  
 583.25  
 583.3  
 583.4  
 583.7  
 583.91  
 5100

**SIMMONS****(Quails Fargo)****Simmons Model**

Model 411  
 Model 411E

**TALO****(Golden West)****Talo Model**

12-DL  
 176-DL  
 176-VR  
 494-DL  
 710-DL  
 781-DL

**MONTGOMERY WARD**  
**(Western Field, Hercules)****Wards Model**

Western Field 14M-497B  
 M25

**Manufacturer's Equivelant Model**

Marlin 81  
 Marlin 81DL  
 Marlin 81  
 Marlin 56  
 Marlin 57  
 Marlin 57 Mag.  
 Marlin 122  
 Marlin 80  
 Marlin 81  
 Marlin 56  
 Winchester 1200  
 Savage 234  
 Winchester 1400  
 High Standard (model unknown)  
 High Standard (model unknown)  
 Harrington & Richardson 120  
 Harrington & Richardson 121  
 High Standard (model unknown)  
 High Standard (model unknown)  
 Harrington & Richardson 120  
 Harrington & Richardson M120  
 High Standard (model unknown)  
 Harrington & Richardson M120  
 Harrington & Richardson M121  
 Harrington & Richardson M121  
 High Standard (model unknown)  
 High Standard (model unknown)  
 Harrington & Richardson 121  
 Stevens 311

**Manufacturer's Equivelant Model**

Savage-Fox BDL 20 Ga.  
 Savage-Fox BDE 20 Ga.

**Manufacturer's Equivelant Model**

Stevens 120  
 Springfield 67  
 Springfield 67-VR  
 Springfield 944  
 Savage 110E  
 Springfield 187

**Manufacturer's Equivelant Model**

Mossberg M42  
 Stevens 520A



# **MONTGOMERY WARD — Continued** **(Western Field, Hercules)**

<b>Wards Model</b>	<b>Manufacturer's Equivalent Model</b>
M25 NH402A	Stevens 820
33	Marlin 336
M40 Over and Under	Marlin 90
40	Marlin 101
M40N (no bolt release on inside)	Stevens 820
45	Marlin 989M2
50	Glenfield 60
M51	Stevens 515
SD52A	Stevens 311
M-SD57	Stevens M87
M59	Stevens M87
M60	Stevens 620
M60 SB620A	Stevens 620A
M80	Savage 29, Stevens 75
M87	Stevens M87
M87-SB87	Stevens M87
M87-SB87TA	Stevens M87
M150	Mossberg 183T
M155	Mossberg 183D
M160	Mossberg 385T
M170	Mossberg 395S
M172	Mossberg 395K
M175	Mossberg 385K
SB300	Stevens 311
SB300-C	Stevens 311-C
SB312	Savage-Fox Model BDL
M550A	Mossberg 500A
M550AB	Mossberg 500AB
M550B	Mossberg 500B
M550C	Mossberg 500C
M550E	Mossberg 500E
SB712	Springfield 840
732/730	Mossberg 810AH
M734	Mossberg 810BH
740	Marlin 336
M771	Mossberg 472SBA
M772	Mossberg 472PCA
M775	Mossberg 800AD
M776	Mossberg 800BD
M778	Mossberg 472SBAS
M780	Mossberg 800A
M782	Mossberg 800B
M808	Stevens 87
M808-C	Stevens 87-J
M808-N	Stevens 87R
M815	Mossberg 320
M822	Mossberg 640K



**Wards Model**

M832  
M836  
M842  
M846  
M865  
M894

**Manufacturer's Equivalent Model**

Mossberg 341  
Stevens 187N  
Mossberg 346  
Mossberg 351  
Mossberg 402  
Mossberg 333

**WESTERN AUTO  
(Revelation)****Western Auto Model**

100  
101  
101Y  
105-2060  
107A  
110-2140  
115-2277  
116-2276  
117  
120-2220  
135  
150-2225  
160  
200-2550  
200-2554  
205  
207  
210A  
220A  
220AD  
220B  
220BD  
220C  
220CD  
225  
250  
250D  
260  
300  
300-300A  
300-300AC  
300F  
300H  
310A  
310AB  
310B  
310C  
310E  
312AB  
312AK  
316

**Manufacturer's Equivalent Model**

Mossberg 321  
Savage 73  
Savage 73Y  
Marlin 80  
Mossberg 640  
Marlin 81  
Marlin 57  
Marlin 57M  
Mossberg 402  
Marlin 99  
Springfield 187A  
Marlin 49  
Springfield 187A  
Marlin 336  
Marlin 336 (.44 Mag.)  
Mossberg 472PCA  
Mossberg 472SBA  
Mossberg 810AH  
Mossberg 800A  
Mossberg 800AD  
Mossberg 800B  
Mossberg 800BD  
Mossberg 800C  
Mossberg 800CD  
Savage 340  
Savage 110E  
Savage 110  
Savage 170, Springfield 174  
Springfield 67  
Savage Model 30, 30AC  
Springfield 67  
Stevens M77C  
Savage 30H  
Mossberg 500A  
Mossberg 500AB  
Mossberg 500B  
Mossberg 500C  
Mossberg 500E  
Mossberg 395T  
Mossberg 395K  
Mossberg 390



# **WESTERN AUTO — Continued (Revelation)**

<b>Western Auto Model</b>	<b>Manufacturer's Equivelant Model</b>
316BB	Mossberg 390T
316BK	Mossberg 390K
325B	Mossberg 385T
325BK	Mossberg 385K
330	Mossberg 183K
330	Mossberg 183
330B	Mossberg 183T
335-3725	Marlin 59
336	Springfield 951
350	Stevens 94
350M	Stevens 94 Series
355YE	Springfield 947YE
356Y	Springfield 944Y
360	Savage Fox Model B
400-400C	Savage 745-745C
420	High Standard Supermatic C-2011
425	High Standard Supermatic C1200 & C1211
460	Springfield 511
2280	Marlin 39A
2282	Marlin 39A Mountie
350	Stevens 94

- *Modern Schools, Inc., Scottsdale, Arizona*

- *Reinhart Fajen inc., Warsaw, Missouri*

- *Reid Coffield, Montezuma, Iowa*



## CHAPTER 9

# TIPS ON SPECIFIC GUNS: HANDGUNS, RIFLES & SHOTGUNS



***"Hey, that looks like a rare Purdy. Wanna trade for summa the stuff I got here?"***

*- Special thanks to Bill Mauldin*

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## HANDGUNS

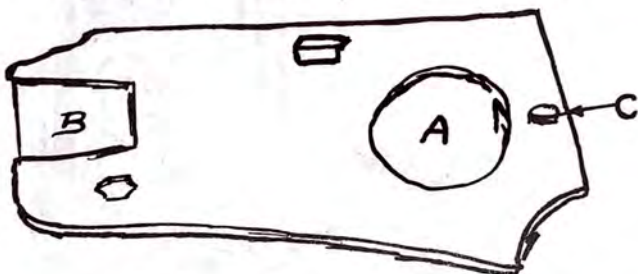
### PISTOL GRIP SAVER

A ferrule of any metal or wood, just slightly shorter than the width of the grip frame, keeps handgun grips from pulling through at the escutcheon or from splitting or warping. Make ferrule a loose, but not a rattle, fit on the escutcheon screw. It holds the grips apart and lets you pull up that screw enough to keep it from working loose, and yet you can easily tell when it is snug enough, and you won't keep torquing it.

- Ken Howell, Corvallis, Montana

### TAKING BERETTA GRIPS APART

When rebluing a Beretta, did you ever try to separate the plastic grip from the steel grip panel when they are grown together with gummed, dried grease or rust? Lay the assembly on



a strip of wood, drop a 3/4" dia. x 1/16" thick washer in the round opening "A" and clamp it to the board with a small C-Clamp and use a parallel clamp in the slotted end opening "B". Now hold the end of a screwdriver against projection "C" and gently tap the metal panel free from the plastic. Before reassembly, file the burrs and high spots from the back side of the plastic, and they will come apart easier next time.

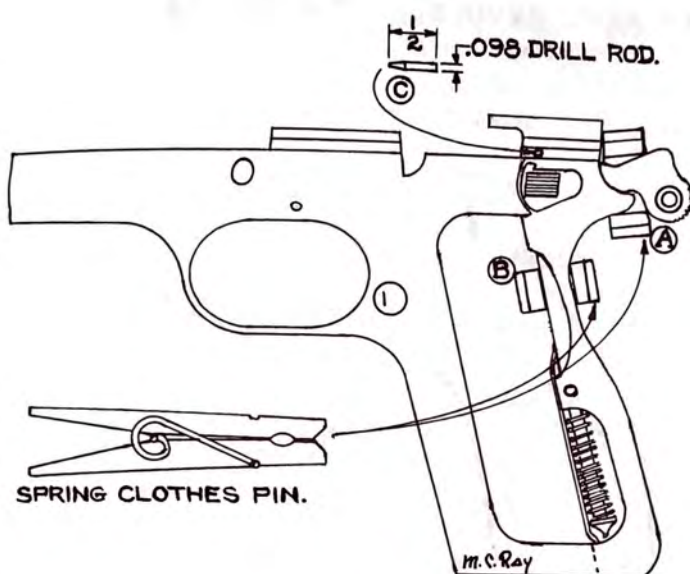
- M. C. Ray, Cleveland, Ohio

### BROWNING HI-POWER ASSEMBLY

Having some 10 Hi-Powers to assemble at one time after rebluing and only having two hands, I decided that there must be an easier way to do it. . . Instead of holding the hammer back, replacing the sear spring and positioning the sear with its hole lined up with the hole in the frame and in the ejector, all with one hand, while picking up and inserting the sear pivot pin with the other hand, I tried this:

A. Pull back the hammer and put on a spring clothespin to hold it. B. Place the sear spring in position and hold it there with



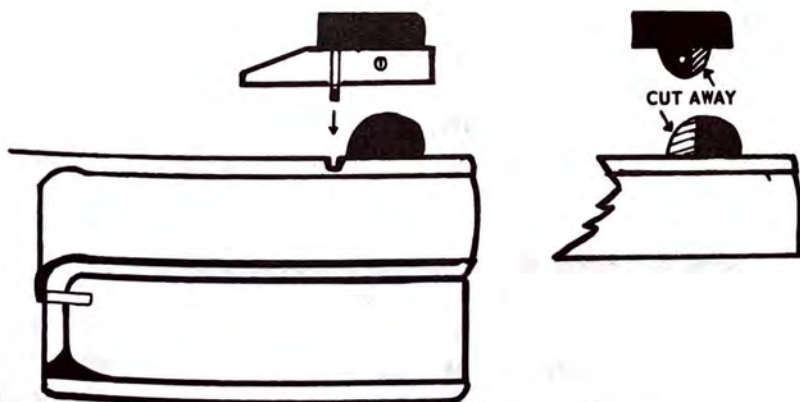


another spring clothespin. C. This leaves both hands free to align the sear. D. Use a pointed slave pin to align the holes, followed by the sear pin. It all takes less than a minute.

- M. C. Ray, Cleveland, Ohio

### BROWNING 9mm FRONT SIGHT INSTALLATION

This is the way I mounted the Micro 2-R front sight on the Browning Hi Power 9mm. Probably could be done on others. This way the blue job is not messed up. Fitted base over the front sight. Drilled and pinned it to the base. Drilled and tapped 3-56 thread under sight blade. Cut off screw and cut slot in screw. Then



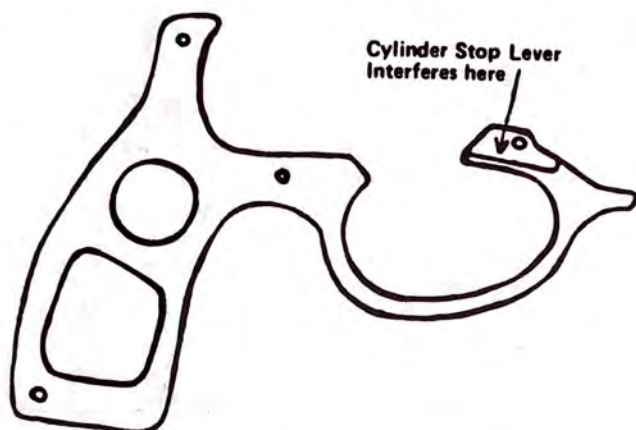
screwed base to slide - won't shoot off.

- A. R. Thomas, Manitou Springs, Colorado



## CHARTER ARMS REVOLVER WON'T INDEX

If you ever get a Charter Arms Undercover .38 that won't index, take off the lower half of the frame and you will find a worn shiny spot in the clearance recess for the cylinder stop, just above



the trigger guard. To correct the interference, either take out the cylinder stop lever and grind about .010" off the bottom, or end mill the recess about .010" larger.

- M. C. Ray, Cleveland, Ohio

## CHARTER ARMS EJECTOR ROD & EJECTOR REASSEMBLY

First of all the parts are fairly simple to get apart. Just line up the holes and the pin which retains the pieces will fall out. But to get them back together again, wow! I finally got a chunk of 11/64" drill rod and in one end drilled a 1/8" diameter hole by 1/4" deep. Simply push this piece on the bushing (it will slip over the ejector rod) and the holes can be easily realigned for the small pin. Works like magic!

- Tom Butler, Denver, Colorado

## SOMETHING FOR EVERYONE...

A small town newspaper published this announcement: "In case you find mistakes in this paper, please understand that they were put there for a purpose. We try to always publish something for everyone, and some folks are always looking for mistakes."

- Fred Moulton, Washington, D.C.

## LIQUID SIGHT INSERT DAM

When putting in a lot of colored pistol sight inserts, I prefer not to mess around with clamps to form the sides. I cut a bunch of little pieces out of a strip of thin magnetic rubber that once held a

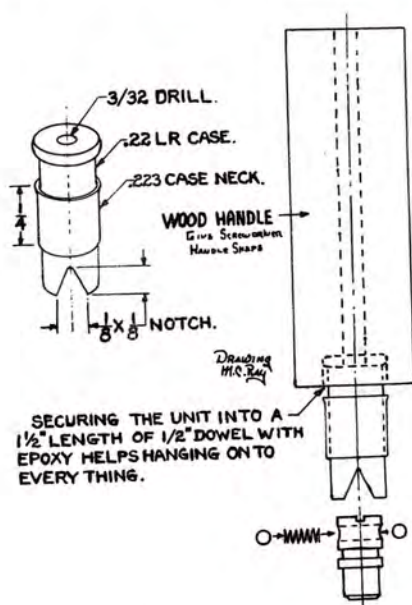


sign on my truck door. Just trim them a little higher than the sight I am working on, set them in place and dab in the liquid. Simple, quick, easy, cheap and effective - a hard combination to beat. Oh yeah, I've tried them with and without release agent. Doesn't seem to matter.

*- Beaver Sport Shop, Delta, Colorado*

## COLT PYTHON - ELEVATOR SCREW ASSEMBLY JIG

I'm sure everyone in the fraternity has fought assembling the elevator screw assembly of a Colt Python (etc.). The detent balls are .0625 and darned hard to hang onto with fingers, tweezers or anything else ever devised by man. My son, Steve, watched me fighting this problem and suggested that I use a container to hold everything together. His suggestion evolved into the drawings. Makes the job easy.



Insert the spring and one detent ball into the elevator screw, then place the .22 case over the screw head so that the detent won't fall out, and be sure the "V" groove is just above the exposed end of the spring. Place the second ball on the end of the spring at the notch of the case, and push down while sliding the sleeve over it to hold everything secure. Locate the screw into its hole on the rear sight and push it into place by using a piece of welding rod or wire thru the hole in the back of the .22 case.

In case you lose the detents, an easy way to make replacements is to chuck a piece of 1/16" drill rod into a drill press and

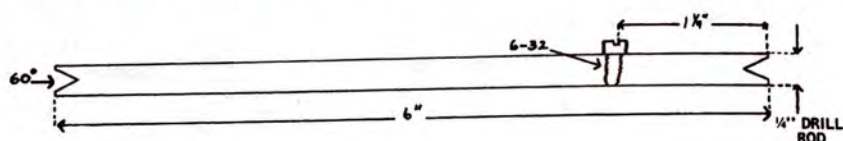


cut off the end with a 1/8" chain saw file. The little tail helps locate the new detents into the spring, keeping them from rolling off and getting lost quite so easily.

- Dick Thaxton, Broomfield, Colorado

### COLT S.A. EJECTOR HOUSING ALIGNMENT

This is a real "oldtime quickie" made more than 35 years ago. I had occasion this week to set back a barrel on a Colt S.A. and match the ejector housing length. Mentioned this to a fellow gunsmith who said that he had a lot of trouble grinding the hous-



ing to the exact length. For the Colt S.A. - run a 1/4" spiral reamer thru the housing (by hand) to remove all burrs. Insert a 1/4" drill rod mandrel, 6" long, with 60 degree cones drilled in each end and a 6-32 hole drilled and tapped 1-1/4" from end. Line up this hole with ejector housing mounting screw hole and insert a 6-32 Fillister head screw. Voila - swing between center or collet and live center and cut for perfect fit.

- Harry Vorkink, Vancouver, Washington

### KEEPING COLT HAND SPRING IN PLACE

To cure a Colt Mark III Trooper or Lawman hand spring that





keeps hopping out of the transfer bar safety, apply one drop of fast-setting epoxy after cleaning mating surfaces with 1,1,1, Trichloroethane.

- M. C. Ray, Cleveland, Ohio

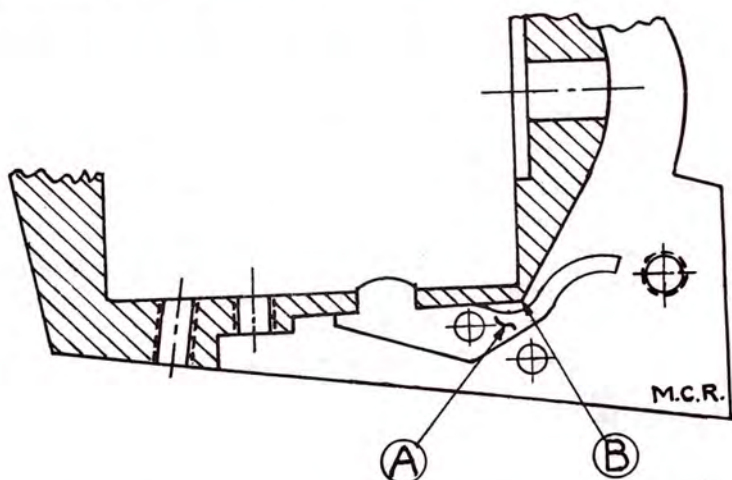
## REPLACEMENT SPRING FOR COLT-COPY

The other day I needed a bolt and trigger spring for a foreign-made revolver like the Colt 1852 Navy. I didn't have one, so I took the magazine cut-off spring for the Browning 12 gauge, fit it and put tension in the right places. It worked just fine. Also this spring makes a good replacement spring for some of the double barrel shotguns; just fit it and you are in business.

- Vernon Gruver, Bixby, Oklahoma

## BOLT STOP MALFUNCTIONS ON COLT S.A. REPLICAS

When cocking the hammer on a number of copies of Colt Single-Actions, the cylinder bolt stop, "A", will lock up on the



sharp corner, "B", inside of the frame before being released by the cam stud on the hammer. This distorts the bolt stop, and it becomes inoperable. The cure is to file a slight radius on the sharp corner "B" so that it allows the stop bolt to clear until released by the hammer. Then straighten the stop bolt to its original shape, and it will work perfectly.

- M. C. Ray, Cleveland, Ohio

## WHAT IF...

Just think what would happen if DuPont should buy Maiden Form Bras and combine them with Remington. You'd just have to

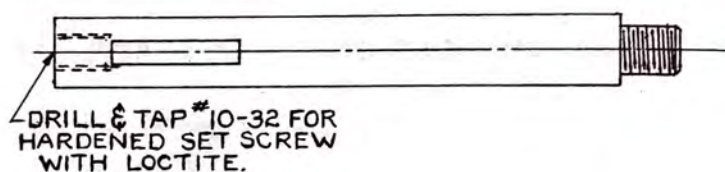


call the company "Boom and Bust!" . . . And here's one even worse (if possible!): skuttlebutt has it that a beverage company has just bought up one of our local handgun companies. The first squirrel-head who writes in wanting to buy one of their "Pop Guns" is gonna get it - right up to here!!

- Bob Sanders, Montezuma, Iowa

## CAP & BALL REVOLVER WEDGE TIGHTENER

The huge influx of inexpensive, imported muzzle loading revolvers has brought about an equal amount of repair work, caused by overloading, ignorance and strong arm methods. The main offender seems to be the barrel wedge holding the replicas together.



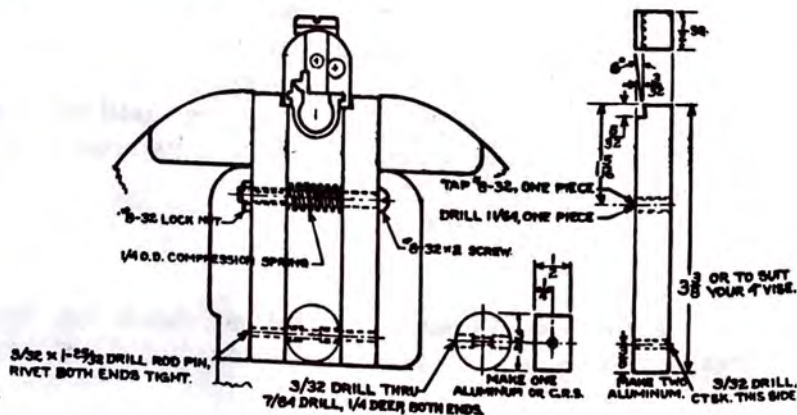
TYPICAL C & B CYLINDER PIN.

Whatever the reason or cause, the slot in the cylinder pin or barrel and/or the wedge are so banged out of shape that the revolver cannot be held together tightly. Many of them show up at the shop bearing many, and not well-placed, peening marks.

Since most of the owners do not want an expensive overhaul job or have the patience to wait for new parts, here's a quick way to get the revolver back in working order. The drawing tells the whole story, and any further slack can be taken up by the owner as the need arises.

- Harry G. Vorkink, Vancouver, Washington

## .45 SLIDE TIGHTENER



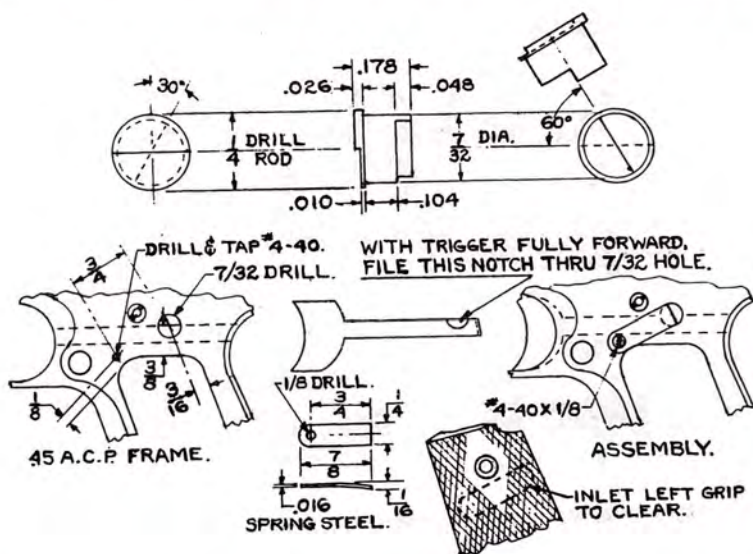


Here is my .45 Auto improved slide tightener. It sure beats trying to hold the two 1/2 square pieces, the 3/4 round piece, and the slide in place while you tighten the vise with just two hands. The 7/64" holes in each end of the 3/4 round allows movement of the 1/2" square parts. The 3/32" rivets hold them all together and the spring keeps them spread for easy positioning of the slide.

- M. C. Ray, Cleveland, Ohio

## .45 MAGAZINE SAFETY

Here is a little gadget that I came up with to add a magazine safety to the Government Model .45. When the magazine is with-



drawn, the spring pushes the button in and securely locks the trigger bar.

- M. C. Ray, Cleveland, Ohio

## EXTENDING M1911A1 TRIGGER

**EXTENDING M1911A1 TRIGGER**

1. Square and dress one end of 1-inch angle iron. 2. Cut one leg, square, 1/4 inch from dressed edge. 3. With checkering file, groove uncut leg, as shown; then cut off 1/4 inch and dress. 4. File to



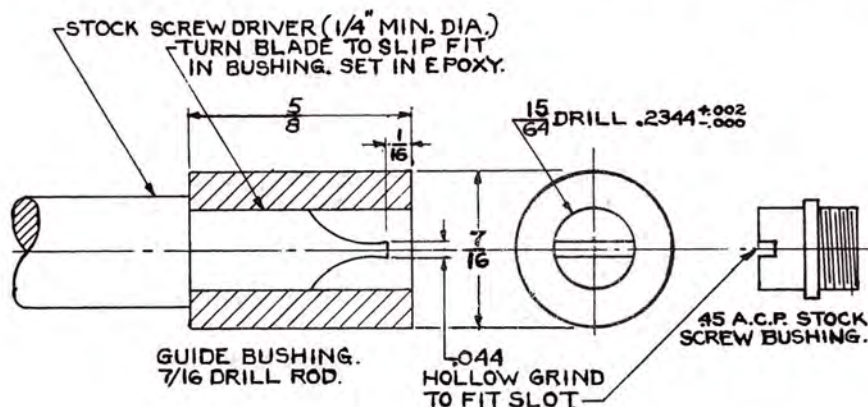


desired thickness, leaving square inside corner at "A" (to allow sharp bend here, next step). 5. Heat at "A" and bend grooved leg as shown. 6. Heat grooved leg; grasp tip with pliers and bend as shown at "6". 7. Cut off tip of grooved, curved leg and file to 0.900" (to clear guard). Dress cut end. 8. Cut off top of fingerpiece on short Colt trigger. Determine desired dimension "X". 9. Jig pieces and solder extension to fingerpiece. Cut off rearward extension. 10. Fit to frame of pistol.

- Ken Howell, Dugway, Utah

## .45 STOCK SCREW BUSHING REMOVER

I found it is nearly impossible to do a good blue job on a Colt .45 Govt. Model pistol without removing the stock screw bushings



and slide stop and safety lock plunger assembly. Trying to remove the staked-in stock screw bushings with a standard screwdriver usually destroys the screwdriver slots. The tool shown in the drawing will allow you to remove them without damage.

Once the frame is reblued, the Brownells stock screw bushing staking tool can be used to replace the bushings.

- Jim Thompson, Topeka, Kansas

## CERROSAFE TRIGGER BLOCK

I got a little ticked with the trigger pull of my Gov't model .45 and decided to do a little touch up on the sear. Rummaged through the junk pile and found a couple of pieces of drill rod that fit the pin holes in the frame. Cut them to about 2-1/2", heated up some Cerrosafe, put the pins in the frame and stuck the long ends in the Cerrosafe. Lo-and-behold a sear block made to order. Acraglas would have worked just as well and could be used for a more permanent block.

- George Muench, Orlando, Florida



## NOT 'TIL THE PAPERWORK'S DONE

Read an article in a national magazine the other day about the changes that have come about in government jobs and labor in general, during the last 25 or so years. According to this article, over three times as many people are involved in governmental clerical work now as there were in 1940.

Just proves that while the government still doesn't know what's going on, it's sure as the devil going to get it all down on paper!

- Bob B.

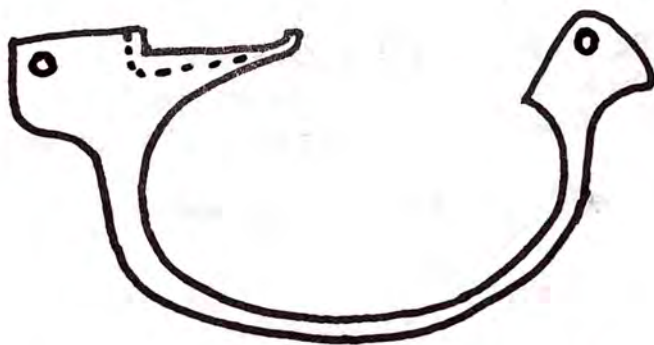
## ANNEALING .45 FRONT SIGHTS

After brazing a front sight on a .45 Auto, I found the sight too hard to file. Repeated torch annealing failed, so I polished and tinned the top of the sight, left the soldering iron (1/4 lb.) in contact with the sight for 3 minutes and that's all it needed.

- Ralph C. Sanderlin, Arlington, Texas

## FITTING TRIGGER RETURN SPRINGS

Couldn't make one of the trigger return springs I had fit in the



H&R, so I re-cut the pocket in the trigger guard. Have had to do that on several occasions.

- M. C. Ray, Cleveland, Ohio

## HI-STANDARD MAGAZINES

The Old Model Colt Woodsman magazine is interchangeable with the Hi-Standard Model B. With a little work, it can be converted to fit the Hi-Standard Model C (.22 short). The #3038M magazine used in the standard grip Hi-Standard and the #1318M magazine used in the Hi-Standard Model HD are the same except the diameter of the magazine button is smaller. The #1318M button is .220" diam. and the #3038M is .314" diam. Just turn down the button to fit the HD Model. The magazine button on the

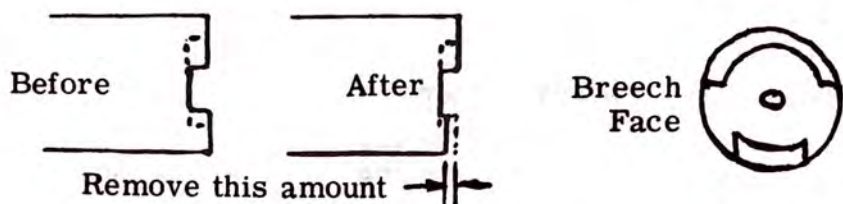


#1318M magazine is smaller than the cutout on the standard grip, so it will fit without any alterations.

- Gary Thiry, Sacramento, California

### .380 MAUSER FEEDING PROBLEMS

After trying everything else to make a new .380 Mauser feed, I found that the lower breech face lip was the culprit. Removing about half the height of the lower lip lets the ammo feed perfectly.

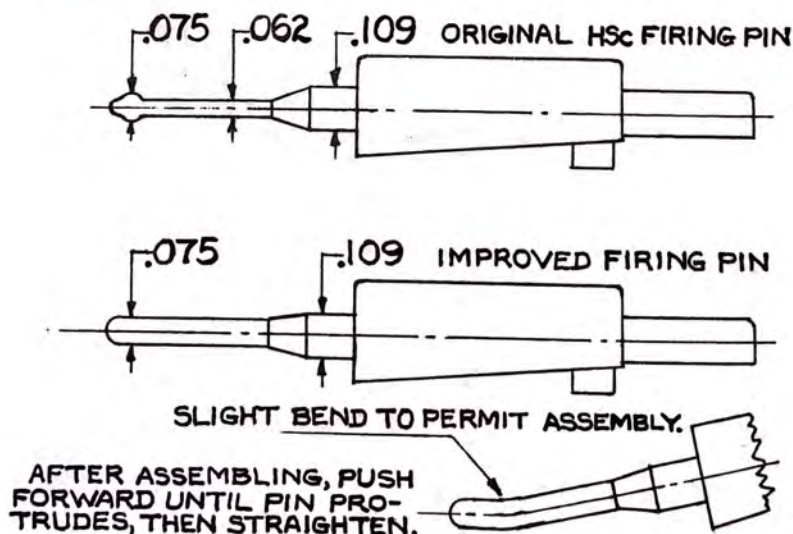


Seems that in getting over this lip and under the extractor the ammo would cock a little and jam going into the chamber. Takes a good file for the job as the slide is well heat treated. Be sure to leave a SMOOTH surface.

- M. C. Ray, Cleveland, Ohio

### MAUSER HSc FIRING PIN IMPROVEMENT

90% of the Mauser HSc pistols in for repair have a broken firing pin, always at the skinny fragile neck. The only reason for this



undercut neck is to permit assembly. You can make a much sturdier replacement out of 5/16" drill rod as shown, without any undercut. Make a slight bend about 1/4 inch from the end and, after

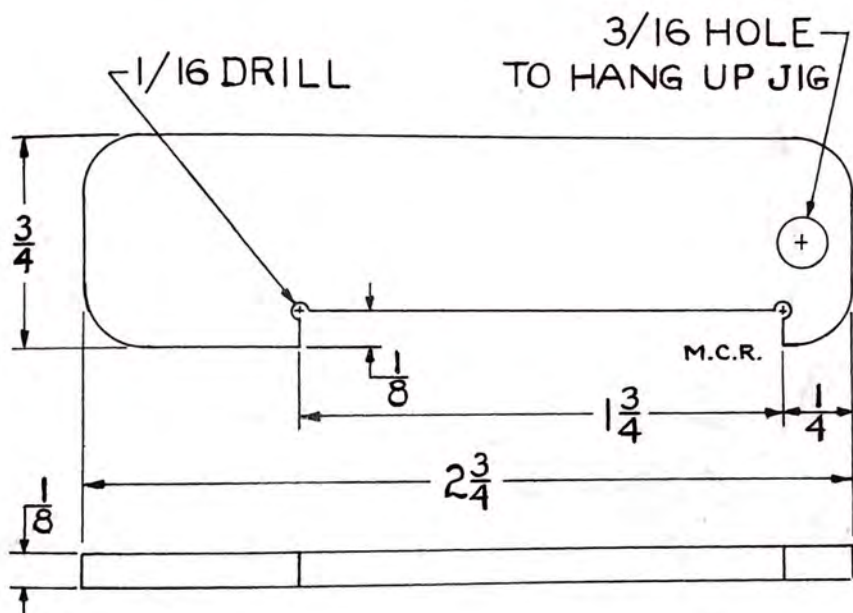


assembling with spring in place, push the firing pin forward until the bend protrudes through the firing pin hole, then straighten out the bend.

- M. C. Ray, Cleveland, Ohio

### REMINGTON MODEL 51 PISTOL JIG

Had a Remington Model 51 Pocket Pistol come in for repair, and it took me a week to remember that it requires a jig to replace the action spring bushing, action spring, and barrel. Here is what I came up with.



To use:

1. To replace action spring bushing, action spring and barrel, compress the 3 parts with the jig. Insert barrel into slide - this may require some force as the spring may bind. Check for free movement.
2. Pull barrel forward to replace firing pin and spring.
3. Replace bolt.
4. Also, to replace the magazine lock, first insert magazine lock follower and spring, then insert magazine lock from left side.

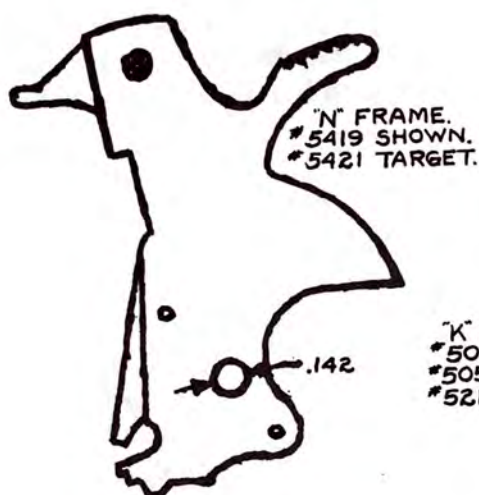
- A. R. Thomas, Manitou Springs, Colorado

### SMITH & WESSON HAMMER DRAWINGS

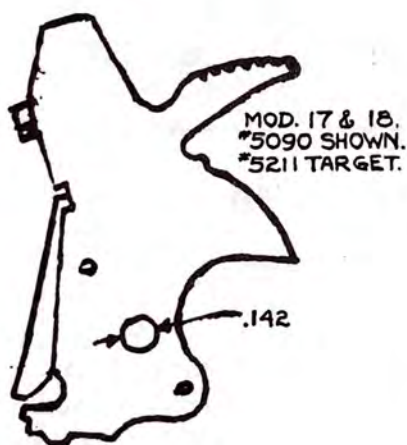
These full size drawings of the S&W Hammers were copies off the ones we keep in our parts department. Having them available



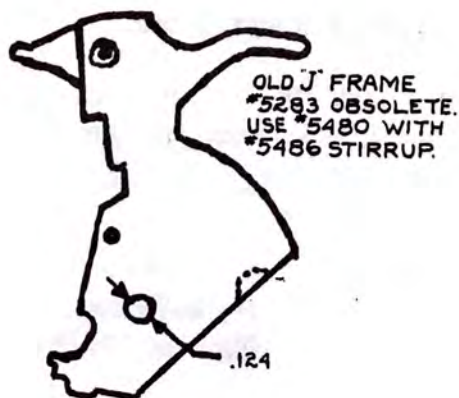
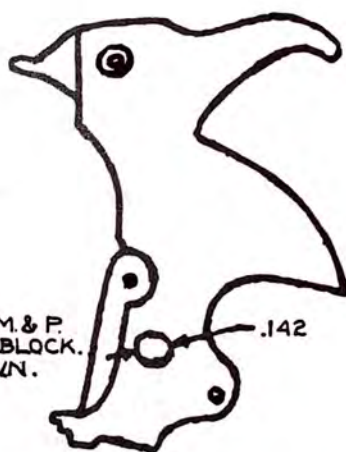
for quick reference has really saved us a lot of time in the shop, makes identification of the right hammer easy and prevents lots of mix-ups. I thought you might like to pass them on to the rest of the brethren.



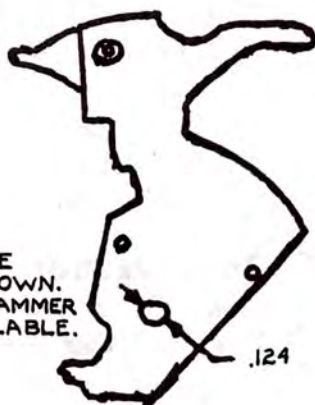
"K" FRAME, C.F.  
#5093 SHOWN.  
#5051 NARROW SPUR.  
#5212 TARGET.



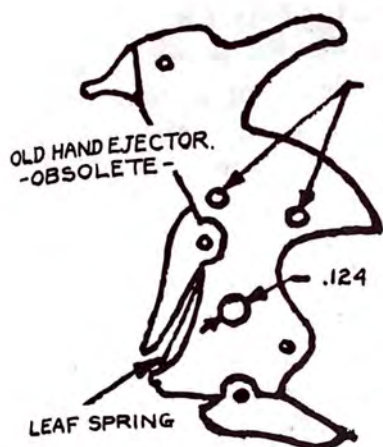
PRE-WAR M. & P.  
NO HAMMER BLOCK.  
#K-31 SHOWN.



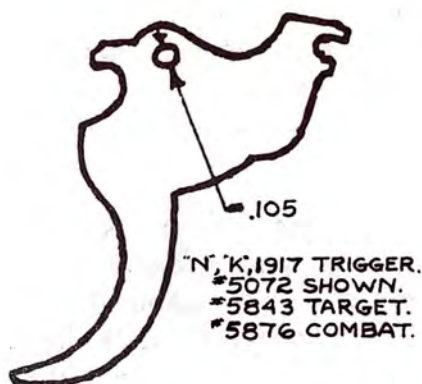
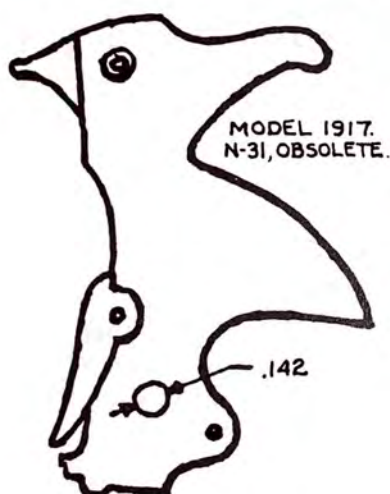
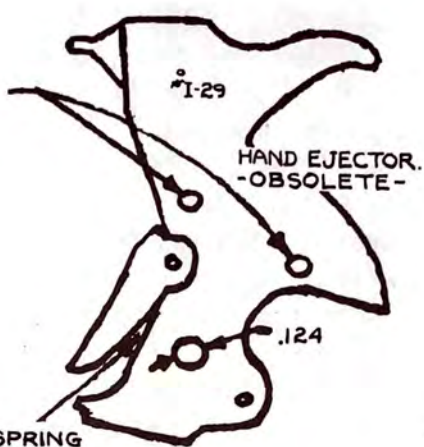
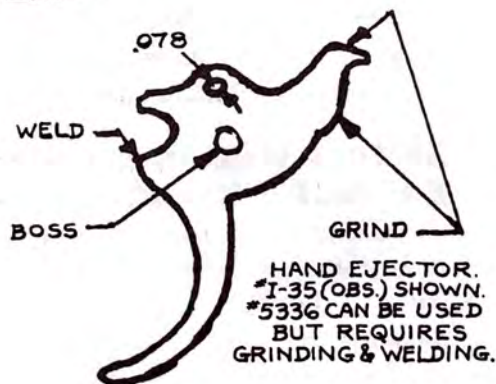
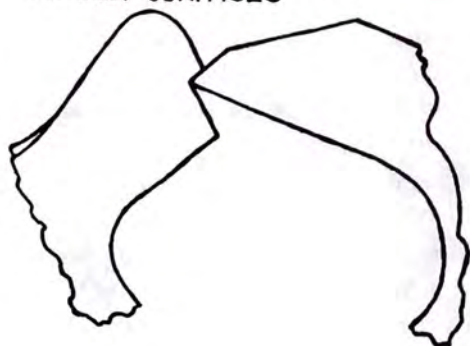
"J" FRAME  
#5480 SHOWN.  
TARGET HAMMER  
NOT AVAILABLE.







BOSSES

S&W HAMMER-TRIGGER  
CONTACT SURFACES



## **PUSHING SOMETIMES AIN'T THE BEST ANSWER**

A kid was dragging a logging chain down the road one day, raising a terrible dust when the constable stopped him. "Son," says the lawman, "why are you dragging that chain down the road?" "Well," says the boy, "did you ever try pushin' one?" Some things just can't be pushed, and this tale is what I used to advantage when a fellow brought me a job one morning, came in for it in the afternoon, and complained that it could have been done in that time if I'd pushed it. The story tickled him and so it made my point without making him mad. He got downright agreeable and understanding after that. A soft answer turneth away wrath, all right, and a funny one can often turn it into good terms. (This bit of very useful and sound advice comes with thanks to Ken Howell, and his story might be worth a try next time the local mad-hatter comes stomping into your shop breathing fire and thunder. However, just in case it doesn't... best be sure Bessy's got the back door open! Bob B.)

*- Ken Howell, Corvallis, Montana*

## **SIGHT CHANGE ON S & W REVOLVERS**

Sometime ago S&W changed their K frame guns and now have the number "3" stamped behind the model. For example, they are now stamped 19-3 while the older model was 19-2. The reason for the change was the relocation of the rear sight leaf screw. The number 2 series uses a number 5100 rear sight assembly. The number 3 series guns will take a number 4080 rear sight assembly.

*- Gary Thiry, Sacramento, California*

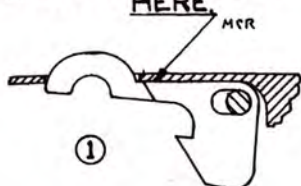
## **SMITH & WESSON CYLINDER LATCH ADJUSTMENT TO CORRECT INDEXING PROBLEMS**

There are so many variables in curing the problem of under-indexing/over-indexing so I thought that I would just go through my standard check list for such problems to point out how I do the adjustment. This way I'll hit everything that I do in case one of the lads might have missed that particular step/check.

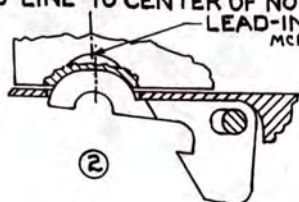
First, get rid of as much unneeded looseness as is practical in cylinder yoke, cylinder stop and hand. Then see that the hand turns the cylinder far enough to engage the cylinder stop in the cylinder. If not, build up and regrind or replace. Check to see that cylinder stop snaps up against cylinder ahead of the indexing lead-in to make sure firm contact is made against a fast turning cylinder enough ahead of time to "catch the notch". Now comes the touchy part. #1 - Check to see if stop extends high enough to fully engage notch. If necessary, remove metal from area indicated in



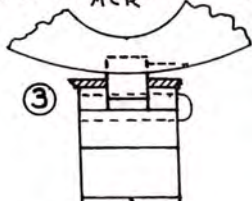
CHECK THAT STOP EXTENDS HIGH ENOUGH TO FULLY ENGAGE NOTCH. REMOVE A FEW .001" AT A TIME HERE.



CHECK THAT HIGH POINT OF STOP ALIGNS WITH CENTER OF NOTCH. GRIND CONTOUR OF STOP TO MOVE RUB-LINE TO CENTER OF NOTCH LEAD-IN.



CHECK THAT STOP IS NOT TOO SNUG IN NOTCH. REMOVE ALL BURRS.



IF CYLINDER DOES NOT UNLOCK PROPERLY, FILE A SLIGHT BEVEL ON TOP OF STOP.

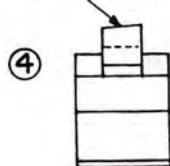


Fig. 1. #2 - Check where high point of arc of stop contacts the cylinder "lead-in" and alter if necessary. #3 - See that width of stop is not so great that it will not fit into "notch", or fits too snug. #4 - Try heavier spring on cylinder stop. Also make sure all burrs are removed from notches. If you get the cylinder to lock up OK but it will not unlock when pulling the trigger or hammer, then bevel lock as in Fig. 4. Also check that front to rear movement isn't so great that it throws the alignment off as indicated in Fig. 2. If all this fails, make up a new word!

- T. L. Black, Bountiful, Utah

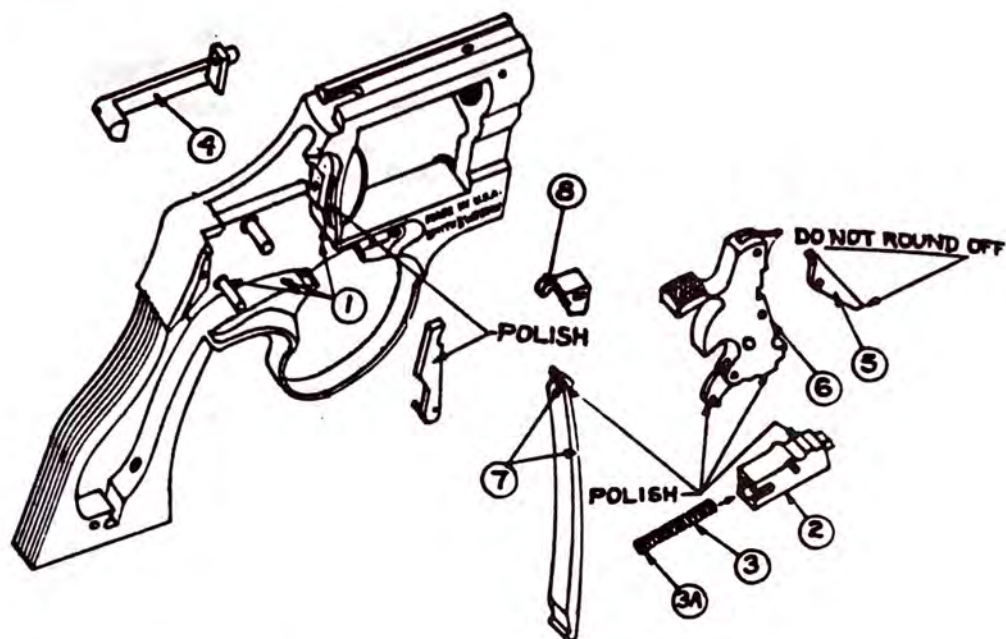
## S & W TUNE-UP

As a double action shooter since the early 1930's, I've developed the following point-to-point procedures to improve S&W actions. A consistent 2½-3 lb. pull on single action and a super smooth 5½-6 lb. on double action was needed. We all know that the older S&W's, with their superb workmanship, require far less work than the modern versions. However, the procedure is the same for any model.

A word of caution at this point. DO NOT touch the hammer notch or trigger on any S&W until all other work has been done first. In all the years and hundreds of Smith's I've seen, I've yet to find a hammer or trigger that needed more than just polishing with a Ruby stone. Keep your &¢%\*\$# cotton-picking fingers away from grind stones, files, grinders, etc. The word is POLISH!! Many fine Smith's have been ruined by the quickie mechanic.

The numbers inked on this schematic denote the order of im-





portance and steps to obtain a good smooth-shooting revolver.

1. This area is the worst detriment to a smooth double action. This is especially true in the newer pieces as the area around the rebound slide stud and the peened end of the frame lug is very rough. Smooth with a number 6-cut bent riffler and a dental scraper. Smooth all along the frame, bottom and sides where the rebound slide moves.

2. Polish both riding sides of the rebound slide with 400 grit paper on a flat surface. Break and polish all edges of slide, then lap in place on revolver frame with 400 grit carborundum mixed with Lubriplate. Clean. Repeat with 800 grit. Clean. Repeat with 1200 grit paste. Clean one more time and then lubricate lightly. The rebound slide should move without any drag.

3. Replace Rebound Slide Spring with a lighter spring-not a smaller one. Be sure ends of spring are square. At this time polish the hammer rebound surface and matching surface on "Slide". Assemble and see if spring will work action properly.

3a. After you have made sure of proper spring tension, cut off 3/16" and replace cut-off piece with a 3/16" ball bearing. Ball should ride against pin. (On super target jobs I use a 3/16" sapphire ball.) Spring and ball should ride in Rebound Spring Slide very smoothly. Polish inside of Slide if necessary.

4. On the newer S&W's this bolt surface is rough and often rides above the frame allowing hammer to drag. Polish it if necessary to remove any drag.

5-6. The Sear will show drag marks on all sides from burrs in



hammer slot. Polish all these sides with 400 grit paper on a flat surface. Remove any burrs on the hammer slot with a 320 grit Flex-stone. Be sure face engaging trigger is polished bright and that all edges are broken. **DO NOT ROUND OFF LOWER SURFACE ENGAGING TRIGGER.**

7. Polish both edges of the mainspring and remove any burrs from stirrup hook. Also, at this time polish Stirrup.

8. Polish cylinder stop **only** far enough to eliminate drag marks on the cylinder. Polish all drag marks on Side Plate, Hammer Block and groove. Edges on all moving parts should be broken and polished. Lube all moving parts with a mixture of Molybdenum Disulphide (Molykote) and Sperm Oil. Assemble, then relieve strainscrew  $\frac{1}{4}$  to  $\frac{1}{2}$  turn maintaining proper ignition and then Loctite in place.

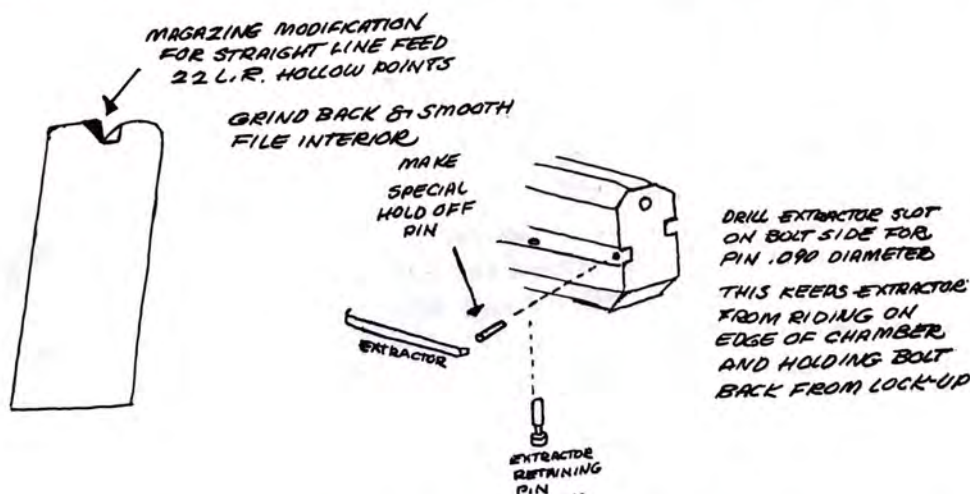
Work action about 300 times and remove any excess lubricant. Clean and lube frequently.

After more than 45 years of constant use, my own S&W .44 Spl. Triplelock has had only one failure, and that was the Rebound Slide Spring. Once you get the sequence and feel down for this job, plus making up a couple of special tools, the work can easily be done in  $1\frac{1}{2}$  hours.

- Harry Vorkink, Vancouver, Washington

## S & W ESCORT - CURING JAMS AND MISFIRES

About 2 out of 5 S&W Escorts require these modifications for police use. I do this on all Escorts and have about 75 in service



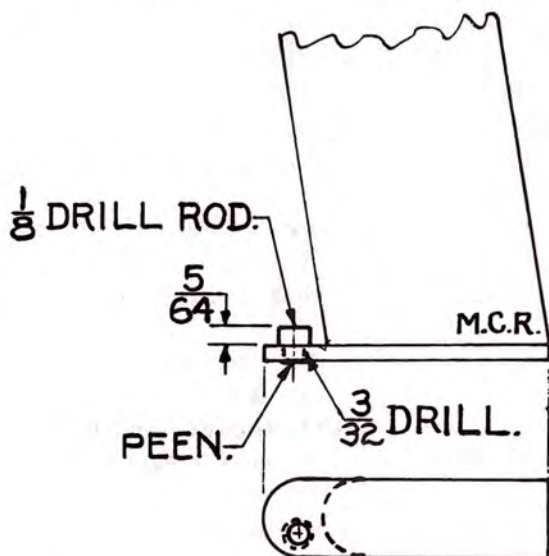
with various departments. Seems to cure the problem as have been doing for 3 years.

- Chuck Kingston, Nehalem, Oregon



### S & W MODEL 41 JAM

I had a new Model 41 in for repair which would jam two or three times out of every clip. I noticed that the extracted case was being dragged across the top cartridge in the magazine with sufficient pressure to mark, and sometimes deform, the soft lead bullet.



Even when it fed properly this would occur, and is not exactly conducive to good accuracy.

Releasing the magazine catch and dropping the magazine  $3/32''$  would allow the pistol to function properly every time. I then drilled a  $3/32''$  dia. hole in the magazine floor plate and made a shouldered stud out of  $1/8''$  diam. drill rod to stop the magazine  $5/64''$  below its original position.

Then, of course, you have to file the latching notch in the magazine up  $5/64''$ , or until it locks on the magazine catch. I had also previously taken out the extractor to check and clean it (found it was not worn) and stretched the extractor spring a little to stiffen it. The pistol now feeds and functions properly every time. (Note: We have seen and heard of a good many other auto pistols with this same problem; this might be a very good cure for them too! BB.)

- M. C. Ray, Cleveland, Ohio

### GOING TO SEE THE DOCTOR

One of the saltier old Gunsmiths in this area who was famous for doing it his own way had never been sick a day in his life, but finally had to go see the Doctor for treatment. A couple of weeks

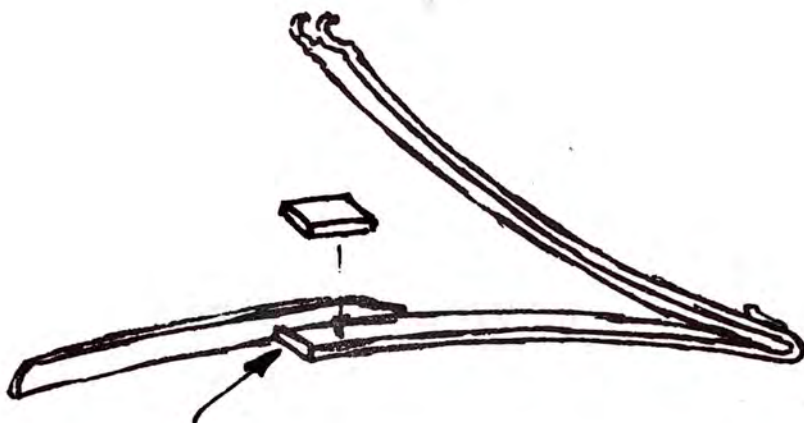


later the Doctor happened to see the Gunsmith on the street and asked, "Did the medicine I gave you do you any good?" "Naw," came the reply, "Didn't help my piles a bit, but sure did ease my sore throat."

- *Wayne Fleming, Montezuma, Iowa*

### SPANISH-TYPE REVOLVER SPRING REPAIR

This surface cams the hammer back off of the primer when the trigger is released to move forward to battery. On older models, due to wear of parts, aging of springs, etc., this face will drop



below the lower rear face of the hammer and jam the action, making it inoperative.

Cut a piece of .050" to .060" thick bronze or brass about 7/32" x 9/32" (or to fit spring) and solder it as shown, flush with the camming surface, with silver-bearing solder. If the portion of the spring that operates the hand has been deformed, gently bend it back (down) to its original shape to get full trigger travel.

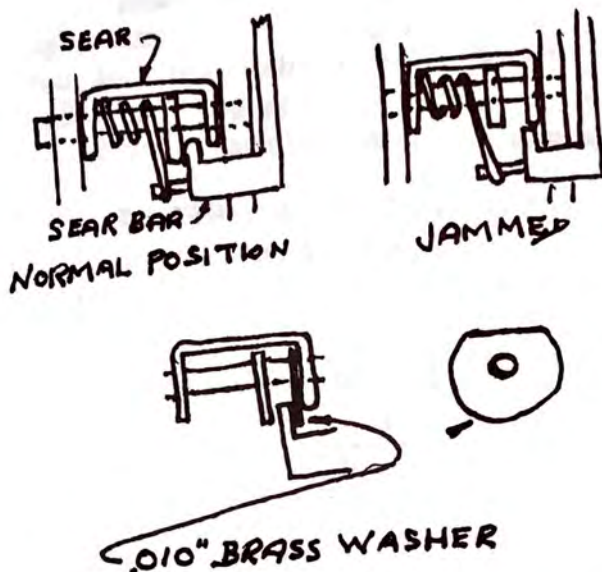
- *M. C. Ray, Cleveland, Ohio*

### STOGER LUGER JAMMING

There is a problem with early Stoeger Lugers (probably already corrected by now) that took me 3 hours of taking apart and putting back together to find.

First shot after assembly always works, but when the sear is released on firing, the sear bar moves outward a little, allowing the shoulder on the sear bar to get behind the shoulder on the sear, making it impossible to pull the trigger. I corrected this fault by inserting the .010" brass washer as shown in the sketch... am sure the rest of the gang will run into this same problem sometime!



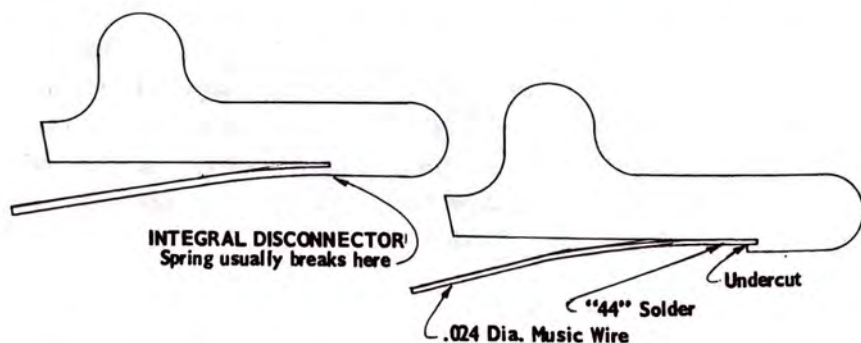


Washer to project about  $1/16''$  beyond the shoulder on the sear. This prevents the parts interlocking and jamming.

- M. C. Ray, Cleveland, Ohio

### WALTHER TRIGGER BAR-DISCONNECTOR

Just finished repairing another Model 9 Walther trigger bar-disconnector and thought I'd pass along my idea, as parts for this



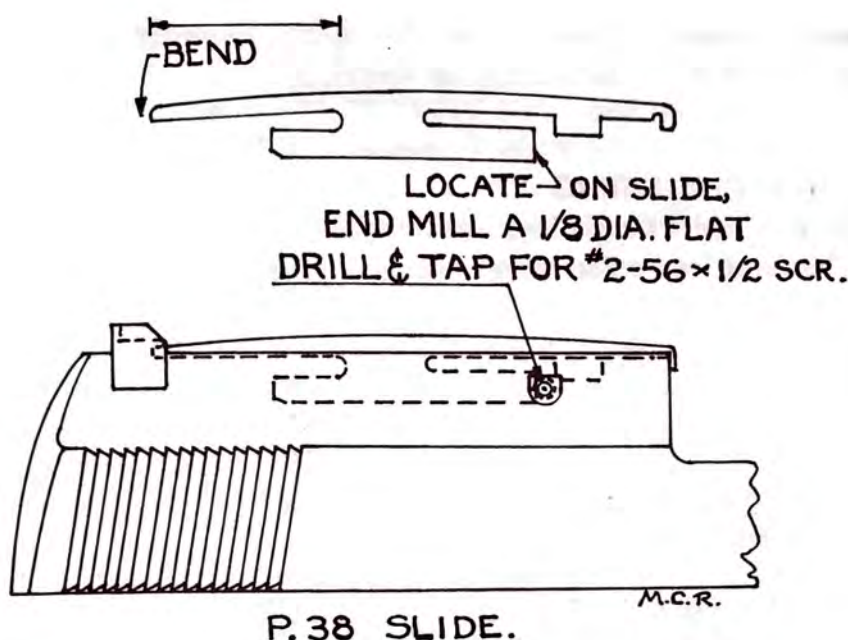
job are usually hard to come by. The disconnecter spring is an integral part and breaks off easily. I make an undercut with a clockmaker's file and insert a piece of .024" diameter music wire and solder it in place with Hi-Force 44 Solder.

- M. C. Ray, Cleveland, Ohio

### WALTHER P-38 MALFUNCTION

I have had problems with the top deck popping off of the P-38





slide and having to search on hands and knees for the rear sight, spring, and plunger... four of them in the past two years, in fact. Some can be cured by putting a little more bend in the top deck. But, the only positive cure is to accurately locate where this face comes in the slide, then drill and tap the slide for a #2-56 x 1/2" long screw that will positively block forward movement and removal of the top deck.

The P-38 slide is not soft, so you will need a sharp drill, and exact location of this hole is important. (I drill it .005" or .010" to the rear of the measured location.) Then after the hole is tapped, file a little at a time off of the indicated face of the top deck projection to allow the screw to enter. (Note: Many older "shooters" need this modification, but, of course, it's not recommended for collectable pieces. Bob B.)

- M. C. Ray, Cleveland, Ohio

## BETWEEN THE DEVIL AND DEPARTMENT

Nobody around here knows who sent this story in - or even when! However, it's "that" time of year again, and this seemed most appropriate, so "Thank you kindly". An investigator from the Internal Revenue Service called the pastor of the local church to say: "We're doing an audit on the tax return of your local gunsmith in town, and noticed that he lists a donation to your church building fund of Three Hundred Dollars. Is that correct?" Without even a moment's hesitation the pastor answered, "I don't

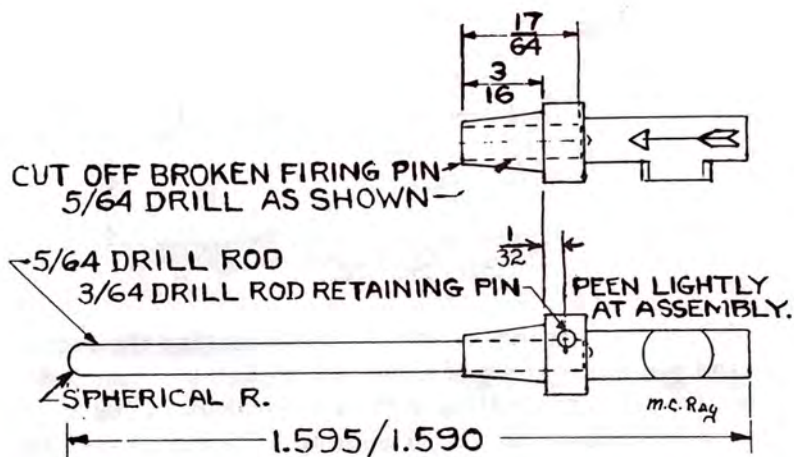


happen to have the records available at the moment, but I'll promise you one thing: if he hasn't, he *will*!"

- Bob B.

### WALTHER PPK FIRING PIN

Here is a drawing of an easy repair for a Walther PPK firing pin. This is a lot easier than making a whole pin. The old one can

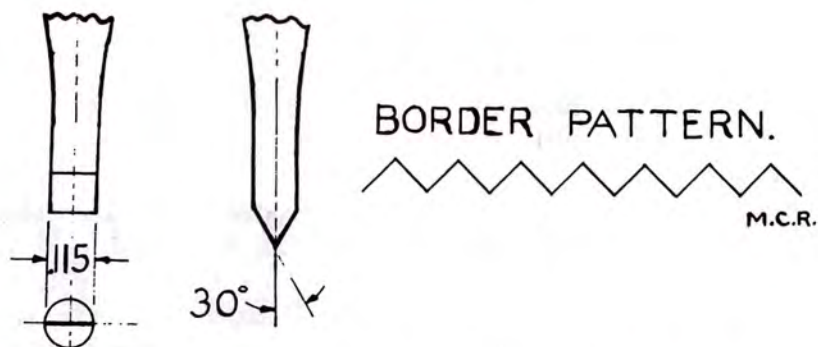


be easily drilled, using Do-Drill, without annealing. (This same procedure can be used on a heck of a lot of other firing pins, too, so keep it in mind when the problem arises. BB.)

- M. C. Ray, Cleveland, Ohio

## RIFLES

### RECURTING BROWNING STAMPING



The border pattern on a Browning .22 Auto had to be recut, and the final job came out quite well. I simply took a broken



punch I had lying around and reground it so that it came to a width of .115" wide, see drawing. After recutting the border, I repolished the rifle and you could not tell it had been recut.

*- Jack Thompson, Birmingham, Alabama*

### **CURING COLTEER .22 AUTO RIFLE JAMMING**

Had a .22 Colteer rifle come in brand new that jammed every time because the nose of the bullet lodged at the lower edge of the chamber. The cartridge feed guide needed to be raised so that the cartridge would feed directly into the chamber.

The guide is fastened to the trigger plate by two .125" dia. pins. Remove the front pin and by firmly, but carefully, pulling up on the guide, you can raise it up by about 3/16". Make a new front pin with a diameter of .095"-.100" and the same length as the old pin. Next make a little pad out of neoprene rubber about 3/8" x 3/8" x 5/32" and push it down under the front end of the guide. Let the pad protude about 1/32" out the front end of the guide. Then push down firmly on the front end of the guide and press in the new pin until it is flush with the sides of the receiver.

With this adjustment, the front end of the guide has been elevated approximately .025"-.030" depending on the diameter of the pin you used. Now the bottom of the guide, which is flanged, may be protuding slightly right at the front end, above the trigger plate rails. File off the flange flush until the bottom of the bolt will ride properly on the trigger plate rails only.

Finally, check the two cartridge guide lugs on the top front of the guide. The left lug will be much higher than the right lug and should be filed down a few thousandths so the bolt can ride on the trigger plate rails and not strike the lug. Just take a small amount off the lug at a time until the bolt clears without striking or rubbing. Once completely reassembled, the rifle should work real slick.

*- William Maxwell, Hicksville, Ohio*

### **ENFIELD 1917 SHORT MAGAZINE BOX**

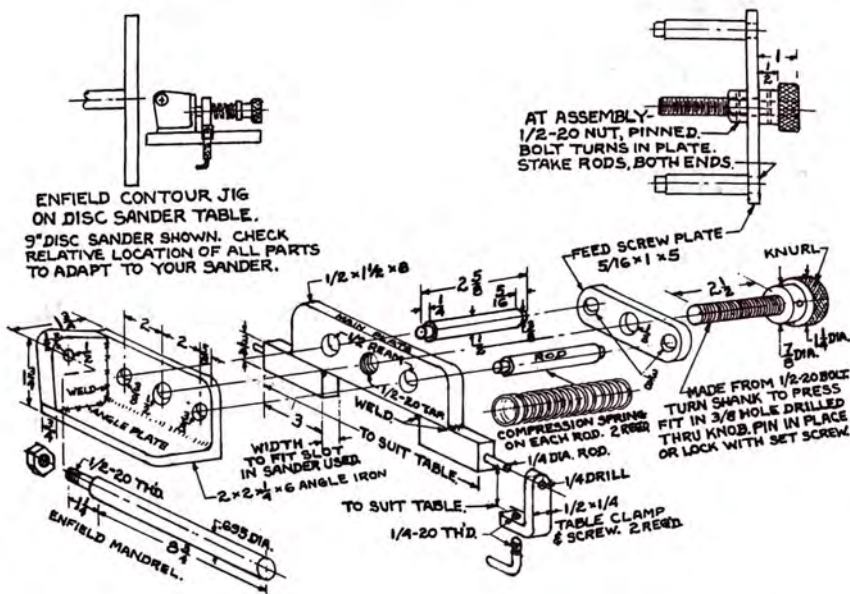
You can use a Remington Model 700 magazine box in place of altering an Enfield box for a short magazine in the 1917 action.

*- Bob Van Kuiken, Wallace, Idaho*

### **FIXTURE FOR ENFIELD WINGS**

Here is the drawing for the Enfield contour jig that I use with a 9" disc sander. To use, I first cut the wings off the receiver, then make a plug for the milled recess and solder it in place with Hi-Force 44 Solder. Next slide the receiver on the bar and rotate against the direction of disc rotation. Advance knurled knob after each





pass. I use a coarse disc to within a few thousandths of the finished diameter. It is also important to mike the receiver often and water quench it often. Use a medium or fine disc to finish up the receiver.

A perfect radius results, and front and rear receiver rings will be within a couple of thousandths when checked with a dial indicator. Once you get used to this system, you can complete an Enfield in less time than it takes to set up the lathe for milling.

- Bill Johnson, Mantua, New Jersey

## H & R LEATHERNECK MODEL 150 MAGAZINE

The obsolete H&R Leatherneck Model 150 magazine, which is stamped "Reising 22 Long Rifle only Mfd by H&R Arms Co. Worcester Mass USA", is interchangeable with the #165061 10-shot magazine used in the H&R Lynx Model 800. (This may be like jumping out of the frying pan and into the fire, but at least there is another choice.)

- Gary Thiry, Sacramento, California

## H & R YEAR OF MANUFACTURER LETTER CODE

Since 1940, H&R has used a letter as a part of their serial number to indicate the year of manufacture of the gun. Generally, this letter appeared as a prefix to the serial number.

Enclosed is a listing of our updated serial number prefixes to use in your new book. (Note: we greatly appreciate H&R's cooperation and courtesy in supplying this list for all of us in the trade. FB.)



## HARRINGTON &amp; RICHARDSON, INC.

## YEAR OF MANUFACTURE

YEAR	LETTER	YEAR	LETTER
1940	A	1964	AA
1941	B	1965	AB
1942	C	1966	AC
1943	D	1967	AD
1944	E	1968	AE
1945	F	1969	AF
1946	G	1970	AG
1947	H	1971	AH
1949	I	1972	AJ
1949	J	1973	AL
1950	K	1974	AM
1951	L	1975	AN
1952	M	1976	AP
1953	N	1977	AR
1954	P	1978	AS
1955	R	1979	AT
1956	S	1980	AU
1957	T	1981	AX
1958	U	1982	AY
1959	V	1983	AZ
1960	W		
1961	X		
1962	Y		
1963	Z		

- John Hart, Assistant to Sales Manager, Harrington & Richardson, Inc., Gardner, Massachusetts

## ON MARITAL BLISS

Overheard a couple of the gals in the back talking about their marriages. Said one, "My husband and I have had eight wonderful years together".

"But you've been married for fifteen years," said her friend.

"Oh sure, but eight out of fifteen ain't bad!"

- Bob B.

## SCREW SIZES FOR CURRENT ITHACA GUNS

The following chart was sent to us by Ken Jenkins who was Service Manager of Ithaca Gun Company at the time. This is the stuff of which dreams are made - all the screw sizes for Ithaca guns... and we hope will save you lots of headaches when you've just gotta come up with a replacement. We all owe Ken a big "Thank You" for this data and all the help it is going to be! FB.



## SCREW SIZES - CURRENT ITHACA GUNS

Part No.	Nomenclature	Size
<b>MODEL 37</b>		
1550	Screw, spring shell stop	3/32-48
1570,1580,1590	Screw yoke	8-36
1560	Screw trigger plate	1/4-32
1480	Screw, carrier locking	4-40
1470	Screw, carrier	1/4-32
350	Bolt, stock	1/4-20
25800	Screw, deerslayer, front sight	6-48
25830	Screw, dummy, swivel	8-36
<b>MODEL 49</b>		
46250	Screw, ejector trip	1/4-20
350	Bolt, stock	1/4-20
46750	Stud, stock      Male 7/16-20 Female	1/4-20
<b>MODEL 66</b>		
31600	Screw, forend	1/4-20
350	Bolt, stock	1/4-20
46750	Stud, stock      Male 7/16-20 Female	1/4-20
<b>MODEL 51</b>		
70450	Bolt, stock	5/16-18
72300	Nut, forend	5/16-18
<b>MODEL 72</b>	<b>-ALL SCREWS ARE METRIC-</b>	
82010	Screw, cartridge guide	M2.6 x .45
82020	Screw, carrier height adj.	M5 x .9
82060	Screw, barrel band	M3 x .5
82088	Screw, receiver side plate	M4 x .75
82096	Screw, tang	M5 x .9
<b>SKB O/U</b>	<b>-ALL SCREWS ARE METRIC-</b>	
88180	Screw, pivot & top lever, locking	M2.6 x .45
88175	Pivot	M13 x 1
88230	Screw, safety adj.	M3 x .5
86097	Screw, spring safety	M2.6 x .45
	Screw, top lever spring	M2.6 x .45
88035,87035	Screw, top lever	M4 x .75
88325	Screw, frame, tang	M4 x .75
88215	Screw, trigger plate	M7 x .5



## SKB O/U Continued

88220	Screw, trigger plate locking	M2.6 x .45
86215	Screw, sear spring	M2.6 x .45
86230	Screw, selector spring	M4 x .75
88200	Screw, trigger adj.	M3 x .5
88195	Screw, trigger spring, retaining	M2.6 x .45
88285	Screw, cocking lever	M3.5 x .35
86097	Screw, forend lever spring	M2.6 x .45
88260	Screw, forend iron-front	M4 x .75
88263	Screw, forend iron-rear	M4 x .75
86360	Bolt, stock	M6 x 1
86365	Nut, stock bolt	M6 x 1
86265	Nut, forend wood	M4 x .75
	Trigger guard front screw	M6 x 1

## SKB S/S

86035	Screw, top lever	M4 x .75
86250	Screw, safety spring	M3 x .6
86230	Screw, selector spring	M4 x .75
86250	Screw, trigger spring	M2.6 x .45
86160	Screw, cocking lever	M4.5 x .5
86155	Screw, cocking lever, locking	M2.6 x .45
86215	Screw, sear spring	M2.6 x .45
86435, 85115	Screw, forend locking block	M2.6 x .45
86225	Screw, floor plate	M5 x .9
86460	Screw, forend iron (M-100)	M5 x .9
86465	Screw, forend iron (M-200)	M5 x .9
86470	Nut, forend iron screw	M5 x .9
86445, 86490	Screw, forend iron push down rod retainer	M3.5 x .6
86335	Screw, frame tang	M4 x .75
	Screw, kicker ejector	M4 x .75
	Screw, extractor retainer	M4.5 x .5

## SKB CENTURY

83320	Screw, forend	Type I M4.0 x .75	Type II M4.5 x .5
83323	Screw, forend lever	M4.5 x .5	
83372	Screw, extractor	M3 x .5	
83387	Screw, kicker, extractor	M4 x .75	
83398	Screw, top lever	M5 x .8	
83423	Screw, cocking lever pin retainer	M2.6 x .45	
83447	Screw, trigger plate	M5 x .5	



**SKB 300/900**

84175

Bolt stock

M6 x 1

**SKB XL 300/900**

85278, 87409

Screw, barrel ring bushing

M2.6 x .45

85395

Nut, stock bolt

M16 x 1

**LSA 55/65**

80104

Nut, firing pin

M5 x .9

80100

Screw, firing pin, set

M4 x .75

80102

Screw, firing pin, lock

M4 x .75

80060, 80270

Screw, guard (rear)

M5 x .9

80090

Screw, trigger, adj.

M6 x 1

80055

Screw, magazine guide

80130, 80268

Screw, guard (front)

M4 x .75

80120

Screw, floor plate

M6 x 1

80015

Screw, rear sight base

M3.5 x .6

80030

Screw, rear sight leaf

M2.6 x .45

80040

Screw, rear sight elevator

M3.5 x .6

80260

Screw, magazine support spring

**LSA TURKEY GUN**

80468

Screw, sight blade

M2.6 x .45

80520, 80528

Screw, forend

M5 x .9

80550

Screw, trigger guard

M5 x .9

80558

Screw, trigger adj.

M4 x .75

80575

Screw, main spring adj.

Stock bolt

M6 x 1

**PERAZZI O/U**

81060

Screw, safety spring

M3 x .6

81150

Screw, cocking bar, check

M2.6 x .4

81310

Screw, cocking rod, boss

M4 x .75

81285

Screw, forend

M4 x .75

81280

Screw, forend, locking screw

M3 x .6

Stock bolt

M6 x 1

**PERAZZI SBT**

81688

Guide, forend push down rod

M7 x 1

81662

Screw, cocking rod

M2.6 x .4

81694

Screw, forend push down rod,  
retainer

M3 x .6

Stock bolt

M6 x 1



**BSA**

89003	Screw, front sight ramp	6-48
89032	Screw, windage	5-40
89038	Nut, rear sight, elevating	8-32
89041	Screw, rear sight, elevating	8-32
89123	Screw, trigger adj.	6-32
89149	Screw, stock retaining (rear)	10-32
89155	Screw, stock retaining (front)	10-32

**MAG 10**

20060	Bolt, stock	5/16 x 18
20680	Nut, forend	5/16 x 18

**KNICK 4E/5E**

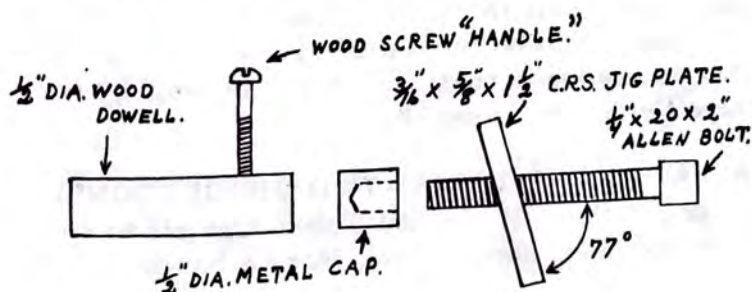
15450	Screw, firing pin check	6-48
15500	Screw, hammer pin, set	8-36
01480	Screw, extractor check, locking	6-40
15480, 15490	Screw, forend	12-28
15670	Screw, forend latch	8-36
05760	Screw, rear tang	8-36
05880	Screw, floor plate	12-32

- Ken Jenkins, Ithaca, New York

**RULES IS RULES**

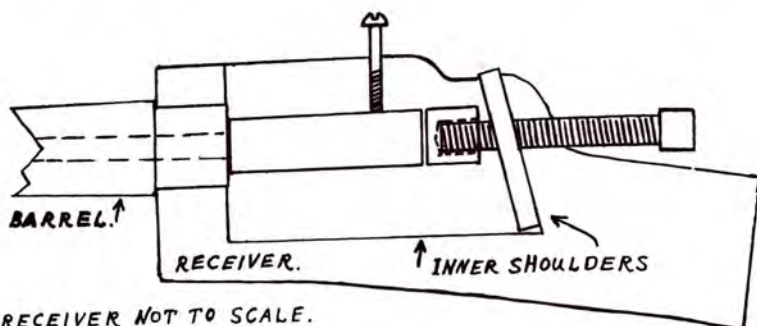
Guests in a Cairo hotel were awakened one night by screams in the hall. Peeping out, they saw a young lady dressed in a negligee being pursued by a gentleman in the nude. Later it developed that the impetuous Romeo was a BRITISH ARMY MAJOR who was promptly courtmartialed. He won an acquittal, however, based on the following paragraph in the army manual: "It is not compulsory for an officer to wear a uniform at all times, as long as he is suitably attired for the sport in which he is engaged."

- Fred Moulton, Washington, D.C.

**ITHACA M49 SADDLEGUN - BARREL REMOVAL**



The receiver must be stripped of all parts. To mark location for bolt in jig plate, use a 3/16" rod with a turned point on one end. Put a tiny dab of inletting black on the point. Hold the jig plate against the inside back and down against the lower shoulders in



the receiver. Slide the rod down the bore & touch the jig plate, and the inletting black will spot the location. The tap hole for the bolt must be on a 77° angle. After making the metal parts, cut a length of wood dowel to fit between the metal cap and the breech end of the barrel. Now turn in the Allen bolt "jack screw" and the barrel will come out easily. This method can be used on other guns with the proper adaptors.

- William Maxwell, Hicksville, Ohio

## REPLACEMENT GUARD SCREWS FOR JAP RIFLES

When you cannot come up with replacements that fit, run a No. 3 drill through the guard screw holes in the Jap receiver (barrel removed of course). Then tap these new holes with a 1/4 x 28 tap. Make new cap screws of an appropriate length and thread them 1/4 x 28, turn the heads to size in the lathe and cut slots with a hack saw and screw slot file. Run a 1/4" drill through the holes in the trigger guard itself (or a letter size F drill for a little "fudging room").

- Erne Lee Ballinger, Sebastopol, California

## UPDATE ON MAGAZINE TUBES

I have found that the Marlin Mod 99 and 99DL tubes are the longest .22 cal magazine tubes made. Also, the obsolete Remington 241 tubes can be easily made from the Browning .22 Auto tubes.

- Dave Donley, Fairmont, West Virginia

## .22 CAL. MAGAZINE TUBES - TWO SUGGESTIONS!

1) Use .22 Rem. Model 550 Tubes. Cut off to desired length and make necessary adjustments. Have a bunch of them on hand



& you can handle about all the jobs that come in.

- *Dave Christen, Wadena, Iowa*

2) Magazines for the Stevens .22 Autos can be converted to fit the Win. M90, 06, 62, 61. Follower must be shortened. Tube must be cut off on plug end to proper length & hole in plug & tube for locking pin must be relocated. You should have a good original mag tube to go by if at all possible.

- *Eldridge Truett, Bishopville, South Carolina*

## INNER MAGAZINE TUBE REPAIR

Once in a while a .22 magazine tube assembly gets banged up, and the little rolled groove on the bottom edge lets the follower slip past the end and into the works. I took a pipe cutter, removed the sharp cutting wheel and reworked it on the band sander to make a rounded edge rather than the sharp cutting edge. I then polished the wheel with 240 grit, and replaced the wheel in the tool. It now rolls the neatest crimp groove you ever saw back into the tube. Works super-fine on either brass or aluminum .22 cal magazine tubes. It is easy to roll too much of a cannellure into the tube, so take it easy.

- *Edwin Haven, Flagstaff, Arizona*

- *Bill Jones, Belmont, Michigan*

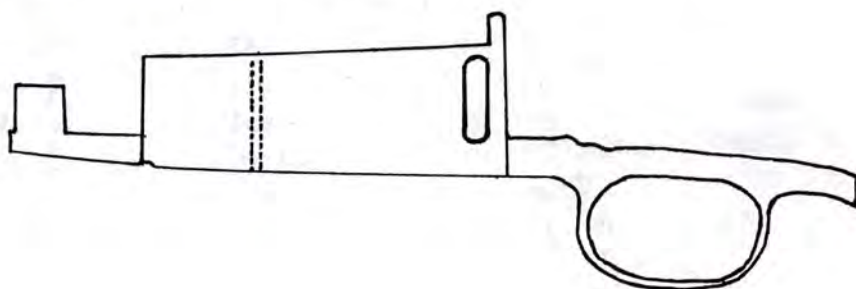
## FALSE ALARM

One of the local shooters starting to return home from a club meeting phoned police to report that thieves had been at work on his car. "They stole the brake pedal, the accelerator and the dashboard." The police sergeant said he would send a squad car around to investigate. Before he could get the orders out, tho, the phone rang again. "Don't bother," said the same voice with a slight hiccup. "I got into the back seat by mistake."

- *Bill Guthrie, Jacksonville, Florida*

## MAGAZINE ALTERATIONS FOR BELTED MAG CASES

To modify standard magazines to accept four belted-head magnum cartridges, merely mill (or drill and hand file) a slot





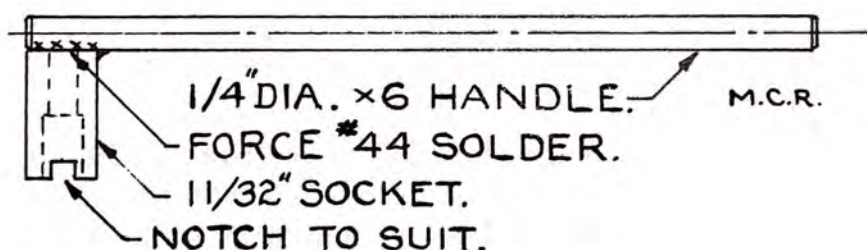
through each side-wall of the magazine. This slot must be  $\frac{1}{4}$ " wide, flush with the inside face of the rear wall, and oblong in shape. Take it to within  $\frac{1}{8}$ " of the top of the magazine where a web of metal is left, and to about  $\frac{1}{2}$ " from the floor plate. The slot merely provides room for the belts of the cases. The magazine illustrated is a reduction of a tracing of Springfield magazine modified per these instructions.

This particular trigger guard is also altered to fit a 1917 Enfield. Simply weld up the rear guard screw hole, then drill and counterbore a new one whose center is located  $\frac{1}{4}$ " further to the rear of the original. The Springfield magazine really streamlines the bottom of the Enfield. I also solder a piece of wire to the inside of each wall of these magazines (see the dotted line in the drawing) to abutt against the shoulder of the cartridges. Really helps to prevent battering soft nose bullets.

- *Ernie Lee Ballinger, Sebastopol, California*

## GAS PISTON TOOL

I have found that you can make an M1 Carbine gas piston tool from an  $11/32$ " socket. Just file the appropriate notches in the end



of the socket to fit the gas piston nut—3 for military and 2 for some commercial models. Then attach the socket to some type of handle for turning off the nut. A steel rod and some Hi-Force 44 or silver solder will work just fine.

- *Tom Bach, Bountiful, Utah*

## M1903A3 REAR SIGHT DOVETAIL

You know that rough male dovetail on the rear of the 1903A3 actions? If you want to leave the customer enough to ever install a scope, you can't do much with it when fixing up an A3 for iron sights. The rest of the gun cleans up pretty well, but that area stumped me. Finally came up with a deal that I like: using a Brownell Sight Base Cutter and a scrap of steel, I milled a dovetail to match on one flat. Then fitted the piece in place and ground it to a matching contour. I polished the piece with the rest of the



gun, then removed it for bluing.

It only raises the rear about 3/32 inch or less, depending on how thin you make the portion over the dovetail. I think it looks much better than the raw dovetail, and my customer is very pleased. I am also using a tight fit and a little Loctite, but the piece could be drilled, and the gun drilled and tapped for a more secure mounting. Just be sure to drill to match the scope mount to be used later!

-Jim Bryant, Corrales, New Mexico

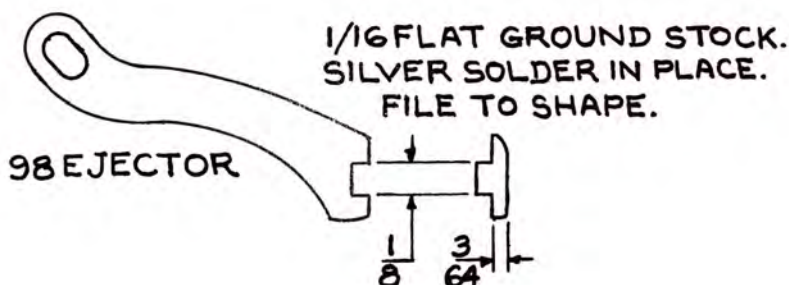
### M93 MAUSER EXTRACTORS

You can replace those high-priced M93 extractors with M1903 extractors at a lot less expense. They fit perfectly and work even better.

-Raymond Burgett, St. Charles, Missouri

### M98 MAUSER EJECTOR REWORK

I do considerable work with M98 Mauser actions, and quite often they fail to eject properly. The sketch shows how I add a piece of

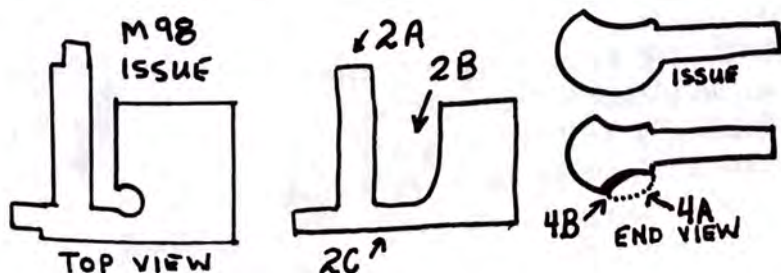


1/16" flat ground tool steel to the ejector for a more reliable operation. After silver soldering the tool steel stock in place, just shape it to the contour and thickness shown. It really does a fine job.

-W. A. Young, King of Prussia, Pennsylvania

### MAUSER M98 SAFETY CONVERSION

To convert the M98 safety from left to right side and adapt it





for low scope, grind away bolt lock (2A), safety retainer (2B), and ridge (2C). Now use Dremel tool, and cut a slot in the right side of the bolt head so that the safety nearly touches the side of the bolt head. Insert striker head and scribe a line on the safety as it is in the down position. Grind away area inscribed (fits 4A). Then cut taper for safety engagement (fits 4B). Adjust to your specifications.

- Ron Freshour, Texas City, Texas

## **WHILE EAVESDROPPING AT THE NRA...**

**NRA CONVENTION:** We met one fine bunch of customers and friends at that clam-bake. The only thing that could have made it any better would have been for you to be there. An awful lot of the old stuff was tossed around in the way of conversation at our booth, which makes it all the more fun. The men all seemed to reflect a very good feeling about business and gunsmithing in particular. Of course, gunsmiths being what they are, they weren't tossing their money around like drunken sailors, believe me. For instance, I was resting in the back of the booth and letting the boys handle the business. At one side of the booth a couple of customers were having quite a conversation and I quite shamelessly eavesdropped because what I heard was so typical of how some of our boys regard spending money foolishly. One was saying to the other, "Okay, so you wouldn't give more than ten bux, but I'm telling you, it really is the fanciest suite in the best hotel in D.C. with the finest food they have to offer, all you can eat AND that blonde to boot. Nuts, I'll even toss in a bottle of booze." The other 'smith stares off into space, shifts his weight from one foot to the other and finally says, "Well . . . I just don't know. Pint or fifth?"

- Bob B.

## **MARK X M98 MAUSER FLOORPLATE AND TRIGGER GUARD**

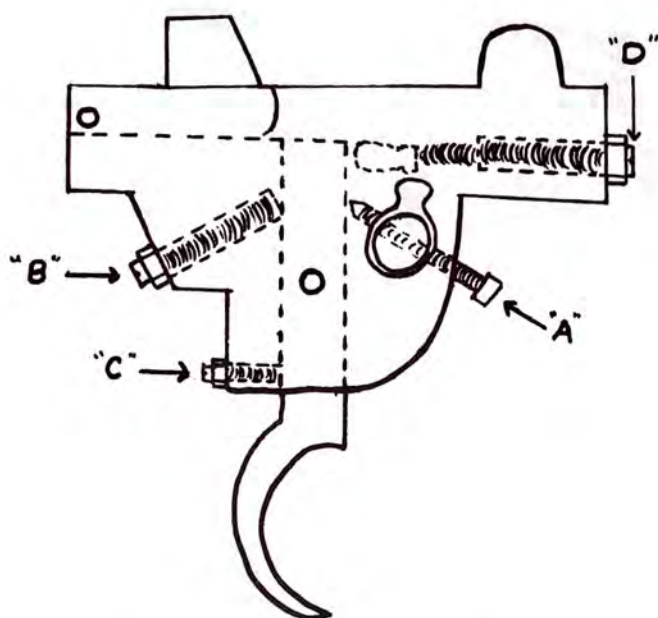
Probably everybody already knows, but the Mark X trigger guard and floorplate fits like a glove on the M98 action. In my opinion it looks a heck of a lot nicer than the original or any of the cast aluminum jobs that are available.

- Lloyd Rentfro, Juneau, Alaska

## **ADJUSTING THE INTERARMS MARK X FACTORY TRIGGER**

Loosen lock-nuts on screws "B" & "C". Back screws out of trigger housing a few turns. Place safety in "on" position (actuating cam toward rear of trigger housing, screw "A" parallel with top of housing). Turn screw "A" in or out until, with downward pressure on the sear, the trigger cannot be pulled far





enough to release sear, as in firing. Engagement can be seen through port in left side of trigger housing. Generally, you can turn "A" screw in until it stops. Do not force it. Now, back out 1/4 turn. Place safety in "off" position, as illustrated. With downward pressure on sear, turn screw "B" in until sear is released. Back out 1/4 turn. Tighten lock nut, and re-check. With trigger pulled, as in firing, and sear depressed, release pressure on trigger, allowing it to rest on the front face of the sear. Then screw "C" in until it contacts trigger - back out 1/4 turn, and tighten lock nut. Re-check entire sequence. You may find need for further minor refinements, usually due to change caused by tightening lock nuts, or perhaps, a tiny bur at some point internally. The "D" screw controls weight of pull, and it is not a good idea to attempt to lighten the pull much. A fall, or setting the gun down butt first a bit hard could cause it to fire if too light.

- Wayne Fleming, Montezuma, Iowa

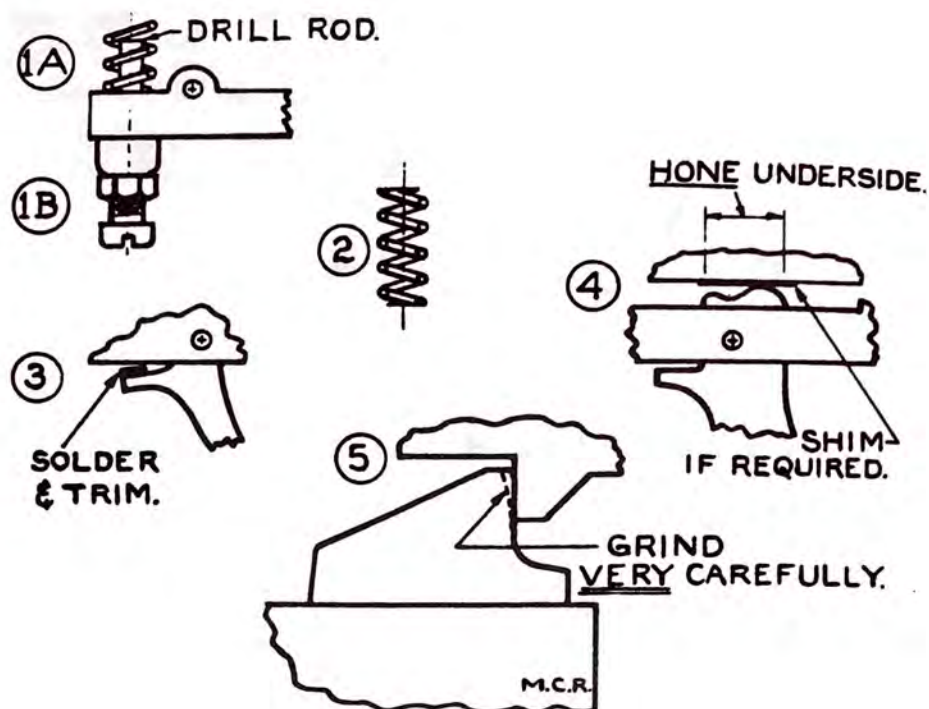
## TUNING A MILITARY (MAUSER) TRIGGER

When the time comes that you simply have to home-tune a military trigger rather than replace with one of the new - and nicely done - ones on the market, this is the method that I used quite successfully. Of course, requires that you love to tinker, have lotsa hours to devote to the project and are a careful craftsman to boot.

You don't have to do the steps in the order given - it's just the way I worked my way through the job.

- 1) Eliminate Overtravel (two alternate methods)
  - a) Drop short length of drill rod into center of trigger





spring, long enough to prevent sear from dropping below engagement farther than needed to clear, yet short enough to let striker fall. This is a trial-and-error proposition; start with a long-enough pin (or too long, really), then cut and try until striker falls.

- b) Drill and tap bottom of trigger-spring well for #6 or similar screw; install screw, with locknut, to provide adjustable overtravel control.

## 2) Lighten Pull

Install lighter spring. Issue military trigger springs are much stronger than need be. But don't use one that's TOO light.

## 3) Eliminate Take-up (First) Stage of Pull

Simplest way I know is to shim the trigger lug so it drops the rear end of the sear the required amount.

## 4) Hone Area On Underside Of Receiver Where Trigger Bears

This smooths the pull, sometimes amazingly. Friction anywhere is a curse on trigger pull. On some receivers, the underside is so rough that by the time you get the furrows harrowed smooth, a shim is necessary. A piece of watch spring works nicely: it's thin, narrow, hard, and slick.

## 5) Grind Sear-Travel Arc On Bearing Surface Of Sear

This is the tricky part, just hunky-dory if done right but



dangerous if done wrong. Note that the sear drops back and down in an arc centered on its pivot pin, forcing the striker backward against the main spring before dropping clear and releasing the striker. Thus the main spring is a good part of the total pull. With the sear pivoting about a pin, gently wipe the bearing surface across a fine grinding wheel or point. The radius is short, but so is the length of the arc, so not much grinding is necessary. Do this right, and the striker moves neither forward nor backward before letting go, and it exerts no camming force on the sear to make the pull harder (as when unmodified) or to cam the sear out of engagement (as it would if the arc were ground too sharp).

- Ken Howell, Dugway, Utah

### MARLIN EJECTOR

The #36-15 ejector with spring for the discontinued Marlin Models 36, 36A, 1936, and 1893 have not been available for a good many years. However, the Winchester Model 12 #12012 ejector with spring will work with very little fitting.

- Gary Thiry, Sacramento, California

- Bill Stanford, Denison, Texas

### "HELPER SPRING" FOR MARLIN 39 LEVER ACTION

Recently a wealthy old gent brought me his nearly as old Marlin 39 Lever Action .22 for cleaning and repair. No way would he bite for rebluing and stock refinishing - (as we say out here in Jersey, 'he was as tight as a crab's a--' and that's waterproof!) Anyhow, it needed a new mainspring and rather than make one or run one down, it occurred to me that what it really needed was a helper spring. So, I got out one of those flat hammer springs you sell for repairing old H&R revolvers, etc., and ground it to 2-7/8" overall. Took my Moto-Tool and ground a small hole in straight end, then drilled out the screw hole (no problem as the heat of the grinding point anneals the steel at the hole). Then after removing hammer and old spring, place the helper spring under the original with the curved end pressing upward against the original spring. While clamping the ends of both springs to the frame with a padded pliers, install the spring screw which is long enough for both. Re-install the hammer, and boy! does that hammer fall!

- Tom Kahaly, Riverdale, New Jersey

### MARLIN 39 INSIDE MAGAZINE TUBE

For quite a while I had problems getting the correct inside



magazine tube for the Marlin Model 39. Below are the model numbers, part numbers, and length of the brass tube only excluding the follower and tip. The part numbers are for the complete tube assembly.

Marlin 39A rifle part number 502122. Tube length 22-13/32".

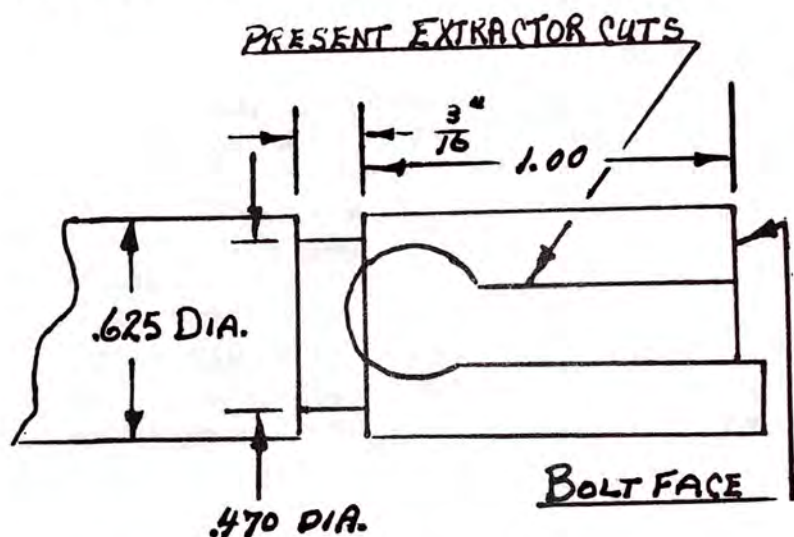
Marlin 39C Carbine part number 601126. Tube length 16-11/32".

Marlin 39D (LTD) carbine part number 502222. Tube length 18-15/16".

- Gary Thiry, Sacramento, California

### EXTRACTORS FOR OBSOLETE MOSSBERGS

This sketch shows a rework I have been doing to the obsolete Mossberg 22's that used the short, flat spring-type extractors.



They have been out of these for years, so I thought you might like to pass this along to the rest of the fellows.

Dimensions shown for groove permit use of Savage Band-Type extractor, Model 87-C, etc.

- Tommy Munsch, Prior Lake, Minnesota

### PARTS FOR MOSSBERG 44-s

When you get in an old model Mossberg (and there are lots of them around), get out their parts catalog and look at the Model Number of the beast on your bench. If it's a Model 44, look at the Model 144, or 244 or 344 if no 144, etc. and you may just find something to fit. Extractors for the Model 46 can be found under Model 146, and THAT beats hell out of setting up the lathe, and the customer is much happier, too.

- J. Kimbel, Brooksville, Florida



## STUCK NIPPLES

When I have the pleasure of removing one of those really stubborn rusted-in nipples, and don't want to leave a wrench mark on it (the wrenches never seem to fit anyway), I take a little hex nut which can be bored to fit the nipple and put a little silver solder on it and the nipple with an acetylene torch using the smallest tip. Do it quickly, then bring them together fast. When cooled, you can back the nipple out with a standard hex wrench socket with practically no effort at all. Clean off the solder, and it will never show up on your restoration. (Boy, with all the ol'timers coming out of the closets, attics, milk houses and basements these days in want of "working over" Tom's idea is a real lifesaver! BB.)

- Tom Beckham, Farmville, Virginia

## OSHA...

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) - This is a Federal Act you are going to hear more and more about the rest of your lives. It covers every possible hazard wherever people work - pages and pages, even on how restrooms and toilets are constructed. Really something, and along with everything else happening to you, you will one day be inspected by one of their men, and as matters now stand, they can fine you without warning.

I think that maybe their attitude on toilets results from an experience E. A. Bixby tells about - and it happened in a gunshop, at that! "This is absolutely true," says Bix, "as vouched for by Esmond Smith, lately of East Tawas, Mich., who heard it directly from the lips of a gunsmith from New Hampshire, whose friend says it happened to a gunsmith he knew." Anyway, it was closing time when a man came barging into the shop and asked to use the restroom as he had just been ejected from the bar next door. The gunsmith gave him directions, and went about getting ready to close up, when he heard a horrible scream. He ran to its source, the cleaning supply room right next to the rest room. There sat the man with an agonized expression on his face. "Your G-D toilet!" he bellered. "Every time I flush it, it comes up and BITES ME!" "Get off that mop bucket, you damned fool," said the gunsmith.

- E. A. Bixby, Cedar Kay, Florida

## PLUGGED MUZZLE LOADER BARREL

If you have an obstruction in a muzzle loader barrel you cannot get out any other way, remove the nipple, drill out or open up the flash hole on the bottom of the nipple, silver solder stem of nipple to automobile grease fitting and simply pump the obstruc-

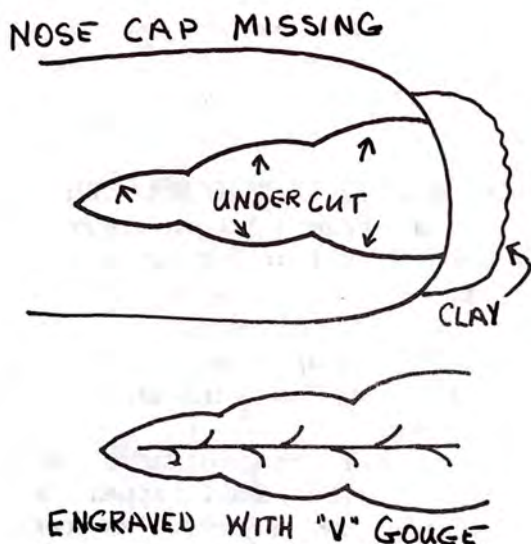


tion out with hydraulic pressure!

- Lloyd Nichol, Peterborough, Ontario, Canada

### CERROSAFE NOSE CAPS

I decided to cast a forend nose cap missing from an old muzzleloading shotgun using the stock as a mould, and Cerrosafe as the metal because of its low melting temperature. First I undercut the stock with a V gouge, and then used clay to block up the places where I did not want the metal to run. I then melted the



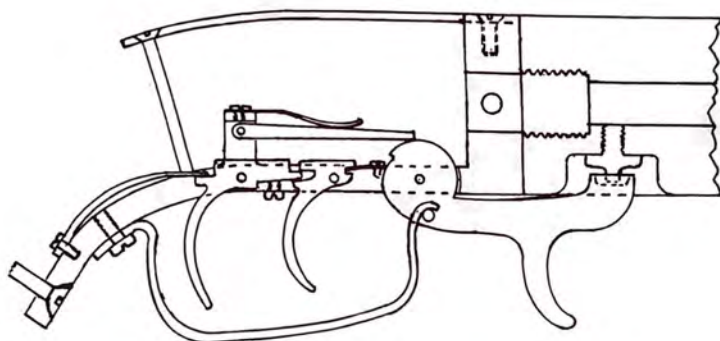
Cerrosafe and cast it into the stock; letting it build up  $1/16$ " higher than the stock. I then filed the "new" inlay down to the stock, and sanded it smooth. I put a piece of paper towel on my bench to save the filings so that I could reuse them for another job. The inlay came out perfect. I sanded with 400 paper, and it looked like silver. I decided to do a little engraving work on the new inlay to dress it up, so I used my V gouge and cut some to match what was on the trigger guard. Then I sanded once more with 400 grit, but it looked out of place being silver, so I decided to use some cold blue on it to see what would happen. I was able to darken it to match the trigger guard. If I do say so myself, the job is outstanding, and it took only  $1/2$  hour to do.

- J. Korzinek, Canton, Pennsylvania

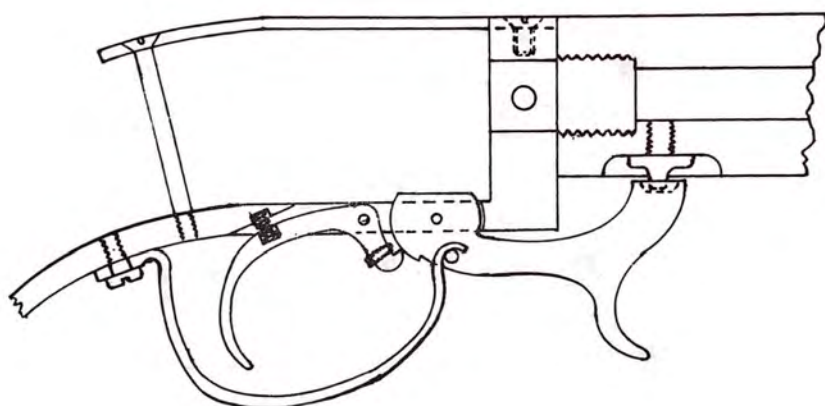
### MUZZLE LOADER UNDERHAMMER DESIGNS

The 5 drawings are of muzzle loader underhammer that have been built here with good results. The 5th variation has been built

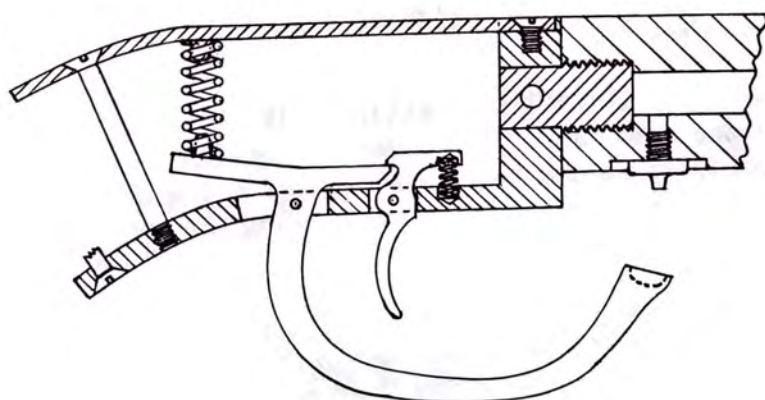




**1) Designed by Charles Hart and Bob Mines.**

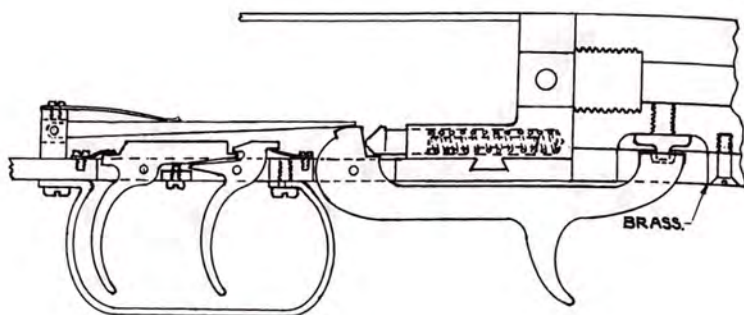


**2) Similar to Billingham Rifle**

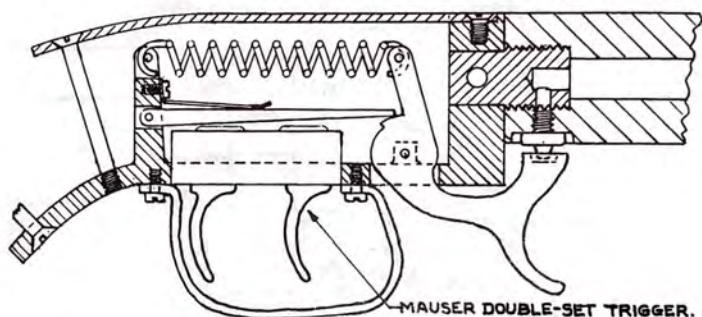


**3) Unidentified.**





4) Dr. Gorning; See Ned Roberts' book, page 290.



5) Design using Double-Set Mauser Triggers.

here using a set of double-set Mauser triggers, like you sell. It requires milling an action out of steel. I have used cold rolled for parts, case hardening wear surfaces. By the way, The Billingshurst rifle is the easiest bench gun to make of the five.

- Bob Mines, Odessa, Texas

## LONG RECOIL SPRING INSTALLING FIXTURE

This one is so simple it is embarrassing - but sure does work! To install those blasted long recoil springs in the actions of auto loaders, like the Marlin .22, without bending the spring all out of shape, I take a 2" length of copper tubing that will slide over the spring, and then section it in half the long way. This gives me two "half-tubes" which I can hold together over the spring until the spring guide pin has entered the hole in the bolt, and then release the "half-tubes". You can remove them easily, and the spring is in its place without a kink or a bend.

- Kenny Lowe, East Alton, Illinois



## REMINGTON TANG SCREW

I found that the Remington Model 11 shotgun and the Remington Model 8 rifle take the same tang screw.

- Gary Thiry, Sacramento, California

## REM. MODEL 512 MAGAZINE ASS'Y

I found that you can use the same magazine assembly as the Remington Model 572 except that it has a different follower.

- LeeRoy H. Wisner, Adna, Washington

## ONEzees OR TWOzees?

Fred Moulton of the Rifleman wants to know if you jim-crack gunsmiths know the difference between a sewing machine and a gal running to catch a bus? Give up? Hah! Sewing machine only has one bobbin!!

- Fred Moulton, Washington, D.C.

## DISASSEMBLING REM MODEL 700 FIRING PIN ASSEMBLY

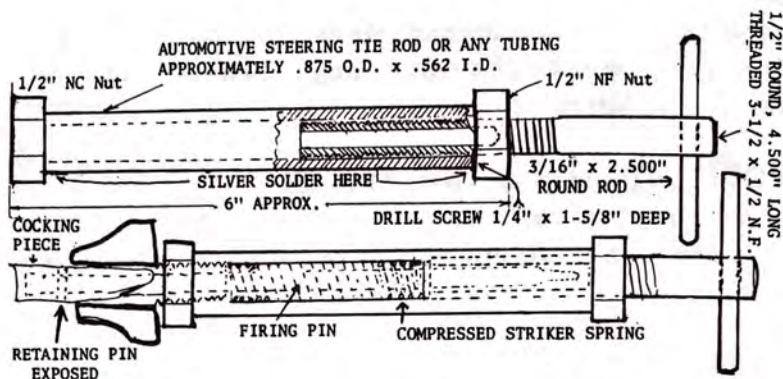
Some of the guys draw back the firing pin and cocking piece and slip a penny between the bolt plug and the cocking piece. Now, when they drive out the firing pin cross pin it all explodes! The solution is simple. Take a piece of 3/8" round stock, 1" long. Drill a hole in it lengthwise with a #17 drill and tap it for 12 x 24 thread.\* Drop this piece down the bolt body and screw the firing pin assembly into the bolt. As you thread the bolt plug into the bolt, the cocking piece and firing pin will be drawn back far enough to drive out the cross pin. Take off the cocking piece and carefully unscrew the bolt plug. It still will be under a slight bit of spring tension, but nothing you can't handle. Works for re-assembly also. (\*Thread the hole so that in case the piece gets stuck in the bolt body, you can thread a long piece of round stock to 12 x 24, thread it into the stuck piece and draw it out. Better to thread it before it gets stuck than after.)

- Fred Sadowski Sr., Denver, Colorado

## REMINGTON STRIKER DISASSEMBLY & ASSEMBLY TOOL

The drawings below are not made to scale, but dimensions shown should be ample. On the one I made up I turned the nuts to just slip into the tubing about an eighth of an inch and silver soldered in place. The tool is used by screwing bolt plug into N.C. thread a few turns, then tighten up on "T" handle. Even if the phone rings or a customer happens to come in when you are disassembling or assembling you can lay things down and nothing will fly apart. You can get the cocking piece back far enough to get



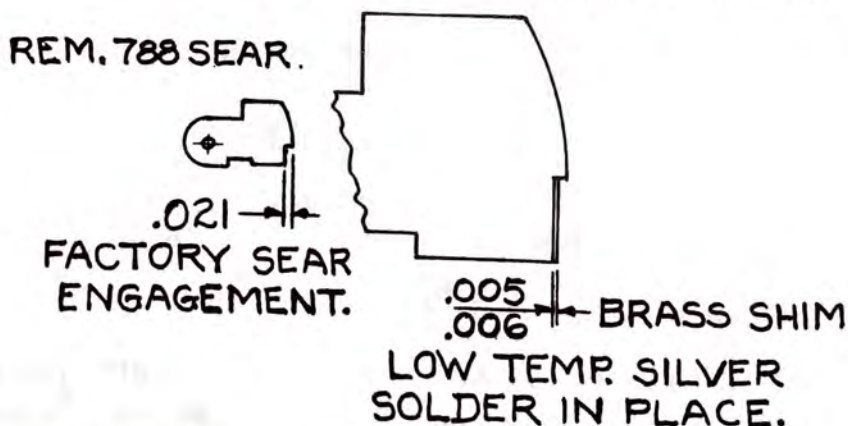


a good stiff punch to the pin while supporting the cocking piece on a piece of lead or blocks. Sort of fun to play with when you know what an onery thing to take apart and put together these striker assemblies can be. First time I took one apart we looked for six hours for the firing pin and spring. Found the spring in the heater and the firing pin on a high shelf in a box of clamps, so decided then and there to do something about it!

- Edwin Haven, Flagstaff, Arizona

### REMINGTON MODEL 788 TRIGGER PULL ADJUSTMENT

You can reduce the trigger pull on those Remington Model 788's that do not have adjustable triggers by silver soldering a .005"-.006" brass shim stock on the factory cut sear engagement



notch, which is usually cut about .021" deep. The brass shim plus the thickness of the silver solder gives me a smooth 3 lb. trigger pull and, with a trigger shoe on, it feels about 6 oz.

I have found that it is easier to silver solder a piece of brass shim which is wider and longer than needed and then file it down to the same thickness and length as the sear notch.

- W. A. Young, King of Prussia, Pennsylvania



## DRESSING UP THE RUGER MINI-14

I use a bit of Brownell's Epoxy Black to fill in the recoil plate screw holes on the side of, and the handguard retaining clip on the top of, a Ruger Mini-14. Took off the excess after it had cured with a file and finished the job with various grades of sandpaper ending with 600 wet 'n dry. A coat of Lin-Speed Oil and a final rubdown with #0000 steel wool and the job was done. Strictly ornamental, and don't ask me what I'll do if ever called upon to remove the handguard clip or the recoil plates, but there you are...it looks very nice anyhow.

- Jim Bianchi, Los Angeles, California

## SAKO MODEL NUMBER SUFFIX

When a "R" follows the Sako action number, such as L61R the bolt face is for a magnum case.

Action Number	Name	Calibers
L61	Finnbear	.270, .30-06, .264, .300 .338, .358, and .375
L579	Forester	.243, .308
L46	Vixen	Small Action
L461	Vixen	Introduced 1962 replaced L46, has detachable mag.

- Gary Thiry, Sacramento, California

## FORE-ARM HANGERS FOR SINGLE SHOT RIFLES

I found this useful in building a copy of Sharps-Borchardt express rifle for a customer on a new Artistic Arms action. Single-shots are cranky about the fore-arm touching the receiver when using high-intensity cartridges (this one was a .30-40 Improved). Whelen used to leave a .025 gap between the wood and front of the action to stop poor accuracy from the barrel vibrations being upset by the fore-arm. Ruger and Hyper solved this with a fore-arm hanger, and it can be done with the Borchardt quite easily, since there is a good-sized rectangular hole in the front of the receiver for the lever spring, which is attached to the barrel. I milled out a mild steel bar  $4\frac{1}{2}$ " long to a tight slip-fit into this hole; the top of the bar was milled out  $\frac{1}{4}$ " deep and the width and depth of the lever spring, and the spring was attached to the bar rather than the barrel. The bottom of the receiver was cut for a 10-32 flat head screw to keep the fore-arm hanger from slipping forward. A pin punch can be pushed into this hole to compress the lever spring while pushing in the hanger. The hanger bar fits into the action  $\frac{5}{8}$ " on the Artistic action; the standard Borchardt original action hole



is a bit less deep. The hanger bar was skeletonized to save weight, inletted into the fore-arm so that the fore-arm tip pushes against the barrel with about 4 lb. pressure. The hanger bar is drilled and tapped for the fore-arm screw about  $\frac{1}{4}$ " from the end of the hanger. Who says single-shot rifles won't shoot as well as bolt actions!

- John Bivens, Winston, North Carolina

### IT'S ALL IN THE SOUND OF THE "MOO!"

One of our farmer-type gunsmiths wrote that a city-type gunsmith friend brought his wife out recently to buy half a beef and save money. The city boy looked in the feed lot and says: "I'll take that cow over there." It was no cow, it was a steer and the city lad wanted to know what the devil was the difference. Not wanting to go into all the action alterations that makes a steer a steer, the country-type thought a bit and says, "Well you could say a steer is sort of a cow, but with a high-pitched moo!"

- Bob B.

### TRIGGER GUARD AND STOCK SCREW THREAD SIZES

One of those frustrating and on-going problems is trying to figure out the thread size of trigger guard and stock screws - especially if the customer brings in the gun with the screw missing. Out of our own collection of "useful info and other junk" we put together the following list of all those that we could positively identify. Hope it's of as much help to you as it has been to us.

#### TRIGGER GUARD & STOCK SCREW THREADS

Model	Thread Size	
Colt 57	Front	1/4x22
	Rear	1/4x22
Enfield 1917	Front	1/4x30
	Rear	1/4x30
Japanese Type 38	Front	M6x.9
	Rear	M6x.9
Krag (U.S.)	Front	1/4x25
	Rear	1/4x25
Lee Enfield No 1, Mk III	Front	1/4x26
Marlin 336	Tang	12x32
Mauser 91,93,94,95,96,98	Front	1/4x22
	Rear	1/4x22
Mossberg 800	Front	1/4x32
	Rear	10x32
Mossberg 810	Front	1/4x32



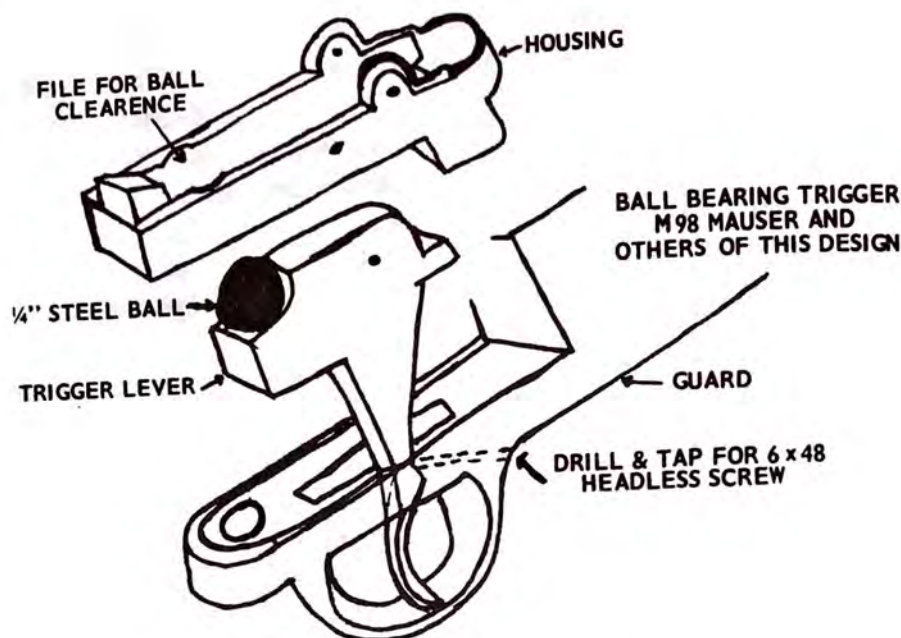
Remington 30	Rear	1/4x32
	Front	1/4x30
Remington 600/660	Rear	1/4x30
	Front	1/4x28
Remington 700	Rear	8x36
	Front	1/4x28
	Middle	8x36
Remington 720	Rear	1/4x28
	Front	1/4x30
Remington 721/722	Rear	1/4x30
	Front	1/4x28
	Middle	8x36
Remington 788	Rear	1/4x28
	Front	1/4x28
Ruger No. 1	Rear	12x28
	Forearm	10x32
Ruger 77	Butt stock	1/4x28
	Front	1/4x28
	Middle	3/16x32
	Rear	3/16x32
Sako	Front	M6x1.0
	Rear	M6x1.0
Savage 99	Forearm	8x40
	Butt Stock	5/16x22
Savage 110	Front	1/4x28
	Rear	1/4x28
Savage 340	Front	1/4x32
	Rear	1/4x32
Springfield 03, 03A3	Front	1/4x25
	Rear	1/4x25
Weatherby Mark V	Front	1/4x28
	Rear	1/4x28
Winchester 54, 70	Front	1/4x32
	Middle	1/4x32
	Rear	1/4x32

- *The Gang at Brownells*

## MILITARY TRIGGER IMPROVEMENT

Here is a trigger "Kink" that works best of all the other versions I have tried. Grind a rounded recess at the rear of the trigger lever approximately 3/16" deep and back far enough to take off both humps. With a round file, open the inside of the trigger housing at the point where the steel ball will rest as shown. Only a slight amount is necessary. Polish all surfaces that the balls con-





tact and harden (not necessary to harden housing). Assemble trigger lever to the housing, drop loose ball through top of housing and assemble trigger unit to action. Steel ball remains loose from other parts of the trigger and is "trapped" in its place when the trigger is assembled to the action.

In addition, you can cut a piece of drill rod about .150" to .160" diameter and just long enough to stop the trigger pull when the sear releases the firing pin. Insert this piece of drill rod inside the spring at the front end of the housing to prevent over-travel of the trigger.

Now drill a #31 hole at the point where the guard bow meets the guard and just behind the floorplate latch, being careful to center the hole with the guard bow. Drill at a proper angle so it will exit at a point above the curve of the trigger lever as shown (scribe a line on the side of the guard while assembled to the action to get proper angle). Tap hole for a 6x48 headless screw, which is made just long enough to obtain proper distance between rear of action and rear of guard. If the work has been done right, you will have the slickest military trigger in the country.

- Bob Kellison, O'Fallon, Missouri

### ADJUSTED TRIGGER RE-ASSEMBLY

When installing a new commercial trigger or adjusting an existing trigger, be sure to check the functioning and pull weight not only before, but after the gun is completely assembled as well. On



several occasions we have found that there is pressure or interference by either the stock or trigger guard with the trigger that is only apparent when the gun is completely assembled. Won't take but a minute; can save a lot of headaches!

- Bob B.

### TRIGGER SHOE CAUTION

Oliver, who's spent a lifetime with Savage, suggests that we warn the fraternity to double-check gun safety after attaching trigger shoes. He writes: "They (shoes) alter the balance on a trigger mechanism so that a rifle, when put down on its butt quite gently, with the safety off, may fire. With all the hoopla going on about consumer protection, you had better warn the boys..." (In this same light, we've received the word that some law enforcement agencies ban the use of trigger shoes because they can work loose and jam trigger movement. BB.)

- Oliver Knode, Jr., Wilbraham, Massachusetts

### CURING A WINCHESTER MODEL 70 TARGET GUN BOLT PROBLEM

I had some trouble with a Winchester model M70 - one of the most accurate I've ever come across. Every once in a while during extractor/ejection (and following no set pattern) the bolt would come all the way out. Of course, this can have disastrous results in rapid fire matches.

The bolt release lever on this particular weapon pivots on the same pin as the trigger, and I found quite a bit of side play at that point. I slipped in a "C" clip lock ring to remove the excessive side movement and have had no trouble since then.

- Howard Evers, North Oxford, Massachusetts

### ROLL PIN A MODEL 70 WINCHESTER BREECH BOLT SLEEVE

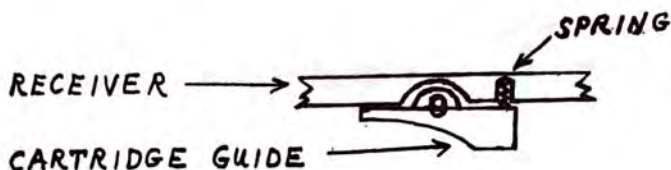
In overhauling the safety on a Model 70 Winchester, the breech bolt sleeve cap pin was broken. One of the roll pins from that kit you sell fit exactly as to diameter and length. Could have used a piece of drill rod, but it wouldn't have done the job as well because it wouldn't have been under tension like the roll pin is when it is inserted.

- Walter Crow, Uvalde, Texas

### WINCHESTER MOD. 74 - .22 AUTO JAMMING

My customer's rifle would jam the first cartridge out of the magazine every time. Operating the bolt slow or fast made no dif-





ference. That first cartridge would jam the nose of the bullet on the edge of the chamber, just under the cartridge guide. The guide is stationary, pinned in place. I converted this stationary guide into a pivoted and spring-loaded guide.

You will find the guide very hard. Turn your torch right on the pin hole and draw the temper until you can just file the metal here. Now slot the hole vertical, filing at the top. Remember, it will take very little filing to allow the front end of the guide to pivot down closer to the edge of the chamber. In fact, we want the lower surface of the guide to lack about .005" to .006" from being flush with the edge of the chamber. In other words, we want the full diameter of the chamber open so that the bullet can slide right in, easily. So, file just a little and check the fit often!! Now, pick out a light but "rangy" spring from 3/32" to 7/64" O.D. You can find one in the Brownell #69 spring assortment.

With the receiver stripped, place the barrelled action up-side-down in your drill press vise. Select a proper drill that will allow a working fit for the spring. Reach down inside the receiver with a slim center punch and mark the location for the hole. Center punch just back of the barrel but far enough that the drill will not scratch the barrel. Check and measure well and set your drill press stop so that you do NOT drill clear through. Now, fit the spring for length so that it can be compressed in flush with the receiver surface. The rifle will now work "slick as a wet gut!"

- William Maxwell, Hicksville, Ohio

## OF UNUSUAL INTEREST

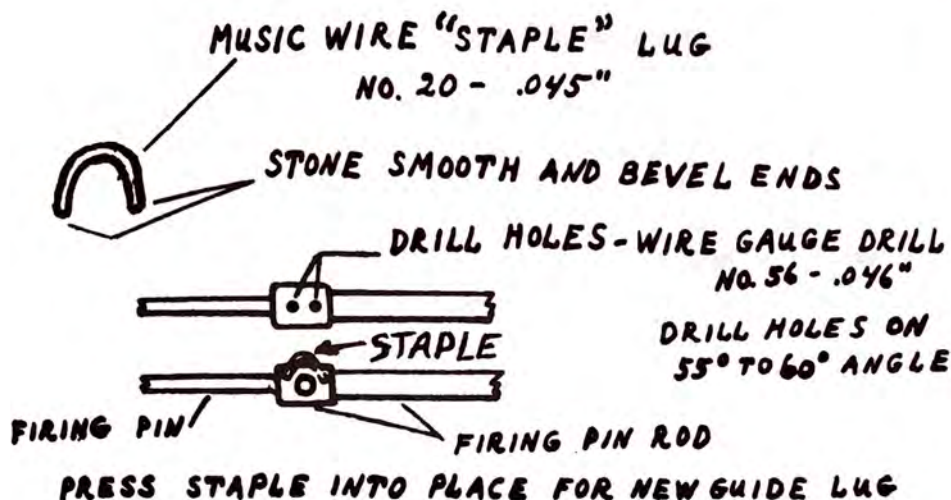
A friend was telling me that if you mixed gin with toilet water that you'd end up with a "John Collins" and that if you mixed vodka with Phillips Milk of Magnesia that you'd come up with a "Phillips Screwdriver"... me, I'm a non-drinker (as most of you know) so I hope I'm telling it right!!

- Bob B.

## NEW FIRING PIN GUIDE LUG FOR WIN. MODEL 74 .22

New Firing pin guide lug for Winchester M.74 - .22 Auto Rifle.





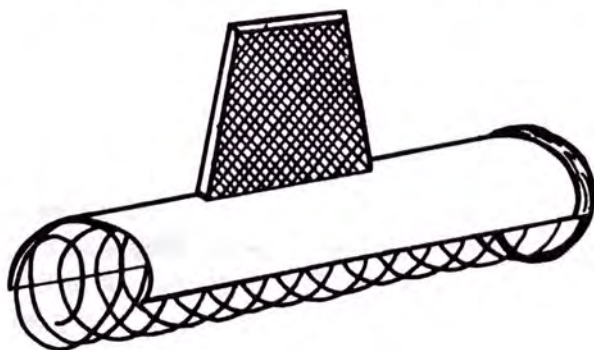
This rifle is obsolete, and the factory no longer furnishes parts. When the original lug breaks, the firing pin is free to rotate. This turns the sear notch out of line, and the firing pin will not cock. This new guide lug replaces the original lug and, of course, is located at exactly the same place. The M74 firing pin is really composed of two parts - the rear rod which carries the sear notch and the front firing pin shaft.

The front hole is drilled in the front end of the rear rod right down to the firing pin shaft AND NO FURTHER. For the rear hole, there is nothing in the way. I believe the drawing shows this better than I can tell it. Music wire is rugged material, and when this lug is pressed into place, in the angle holes, it will stay there. If the lug should fit a little snug in the bolt slot, just dress the sides of the lug until the firing pin slides freely.

- William Maxwell, Hicksville, Ohio

## REMOVAL OF THE BOLT FROM WINCHESTER 190 ETC. SERIES

To remove the bolt from the receiver, you must remove or compress the recoil spring. This sometimes is a hassle because the





spring may slip from your grasp. To avoid this, I thought that an assist would help. My idea is to take a piece of tubing large enough to fit over the recoil spring. Then cut the tube in half. Next step is to attach a back plate on the tube half. The length of the tube depends on your desires. You then attach a handle. For a better idea refer to the drawing. The handle design is also up to you. To remove the bolt, pull the spring back just enough to slip the spring assist over the spring. Then pull back on the assist with one hand. Remove the bolt with the other hand. To replace the bolt, place the assist over the recoil spring. Pull back the assist with one hand and place the bolt back into the receiver with the other hand. Let the assist slowly forward until it is touching the bolt face. Then pull up gently on the assist until it is removed and the spring contacts the bolt rear.

(Note from Bob B.: When Steve sent this Kink to us he was barely 14 years old and altho his pappy, being a typical dad, made a couple of additions, it still is Steve's Kink, and just the way he sent it in. Sure does my old heart good to see sharp youngsters taking an interest in this challenging profession!)

- Steve Thaxton, Broomfield, Colorado

### **WINCHESTER MODEL 1890 MAINSPRING**

The Winchester 1890 pump action .22 rifle mainsprings are no longer available. However, the "Old" Model 94 Winchester (pre 1964) mainspring part number 10694 with the number 5594 mainspring screw will work. Just remove a little metal from both sides of the front of the mainspring where the hammer stirrup engages it to allow free movement inside the action.

- Gary Thiry, Sacramento, California

### **WINCHESTER MODEL 94's**

Beginning with Serial #2,700,000, all Model 94 receivers were, and are, manufactured from "Graphitic Steel". This material requires that the receiver surface be iron plated prior to bluing, and the iron plating process must be repeated each time the receiver has been repolished. Therefore, unless iron plating facilities are available, it is best that any Model 94 receiver carrying a serial number above 2,700,000 be returned to the plant for rebluing. Conventional bluing techniques may be employed on any Model 94 receiver numbered below 2,700,000.

(From Bob B.: Boy, Oh Boy, are we glad to get THAT information after all this time!! Long before World War II I got completely fed up trying to get a blue job on an old Iver Johnson frame. A fellow in the plating business and I rigged up an iron



plating outfit using a piece of stove pipe as a source for the iron, an old crock and a car battery. It did plate the frame and the iron did blacken nicely. Didn't wear so good, however - but it is a process you might consider if you ever get stuck with a barrel full of those old ones to do. . . .)

- C. W. Hummel, Manager, Product Service - Firearms - Winchester-Western

## UP-DATE ON WINCHESTER 94's

In spite of rumors to the contrary, all 94's with numbers above 2,700,000 cannot be reblued. We had heard that numbers above 3,000,000 could be blued so Ken Raynor, our Customer Service Manager, wrote Winchester. Their answer: "The material composition of a Model 94 receiver has not changed since 1964 as stated in my January 19, 1978 letter. The misunderstanding you report concerning another revision beginning at approximately 3,000,000 is incorrect and may be due to the fact that for several years we utilized black chrome as our Model 94 receiver finish. . . ."

- Bob B.

## WINCHESTER MODEL 94 SIGHT CHANGE

I've been reversing the rear sight on Model 94's to move it forward about 5", which allows older eyes to get sharper definition of both front and rear sight. The fore-stock band needs to be slotted about 3/16" along the top surface to take the elevator for the rear sight.

- Dan Plamondon, Crescent City, California

## NEW SCREW FOR FOREARM BAND OF THE 94 WIN. CARBINE

Did you ever twist off that screw and wonder where in Hell you were going to get another one? I guess that's a silly question as it's happened to everyone and every shop has the replacement - several of them - if they have ever worked on a Model 1917 Enfield. It is the screw that holds the rear sight in the receiver! Rework the head of the screw to fit the counter-sink in the band and you have a screw with the right thread and the right length.

- Les Clark, Cheyenne, Wyoming

## SHOTGUNS

### HOW NOT TO DEMONSTRATE A DENT RAISER

At a local gun show a gunsmith, who had just gotten ahold of one of those miracle tools in 12 ga., was offering to raise dents



with it as a demonstration. A neighboring exhibitor had quite a display of rather ornate shotguns and was bugging the gunsmith about the mystic values of the dent raiser. The bugging got rather vicious when no one showed up with a dented gun needing dent raising. Finally, after a particularly nasty remark by the gun owner, the gunsmith grabbed one of his tormentor's prize shotguns, rapped it smartly against a concrete corner post. Guess what. It was 16 gauge!

- Doug Michie, Williams Lake, British Columbia, Canada

## IDENTIFYING MARKS ON BROWNING CHOKES

With the advent of the plastic shotgun wads, the full choke is not as popular in this part of the country as it used to be. Many of the sportsmen want their chokes opened to improved modified or modified. The Browning choke marks are as follows:

Full	*
Imp. Mod.	*-
Mod.	**
Imp. Cyl.	**.
Skeet	**S-
Cyl.	***

I have a small chisel the size of the lines in the asterisk. When a full choke is opened to improved modified a "-" is stamped behind the original asterisk. An improved modified code can be changed to modified by three additional strikes of the chisel (over the dash to form an asterisk). I strongly recommend that any time a barrel has been altered from the original it should be remarked.

- Gary Thiry, Sacramento, California

## TIGHTENING LOOSE STOCKS ON OLD BROWNING A-5 AUTO SHOTGUNS

I don't know if anybody has had trouble there with older Browning autos shooting loose in their stocks. An old gunsmith (now deceased) that I did a bit of work with used to thread the inside of the breech block return spring tube. A threaded plug is silver soldered into the tube. The tube is also threaded internally for a stock bolt. The stock is then drilled through to take the stock bolt. We never had trouble with one of those old guns after the alteration, and it saves a lot of stocks being replaced.

- Fred Gibson, Upwey, Victoria, Australia

## REMOVING BROKEN STUB OF A-5 BROWNING ACTION SPRING TUBE

Removing the broken stub of an action tube from the receiver



tang of a Browning Auto-5 shotgun can be a really miserable job, as they always seem to break off through the threads, leaving nothing to get a hold of. To further aggravate the situation, the thin wall thickness of the stub resists the use of any of the conventional "easy-outs" as it seems to spread the tube and wedge it in even tighter. So, to solve this frustrating problem, I take a 5/16" square HSS tool bit and grind both ends as square as possible. Then drive the tool bit into the broken tube stub with a hammer. This causes the corners of the tool bit to cut four grooves in the tube from .010" to .015" deep. After it is driven in from 3/8 to 1/2 inch, I put an open end wrench on the tool bit and back it out. Works good on Remington M-11's and Savage M-720's too.

- Tommy Munsch, Prior Lake, Minnesota

### **BROWNING AUTO-5 WITH BROKEN ACTION SPRING TUBE FOLLOW-UP - HOW TO SALVAGE THE TUBE**

A while back I had a Browning Auto-5 in the shop with a broken buttstock, and, of course, the action spring tube was broken at the tang. Just as I was about to give up and send the gun to the factory, your Newsletter came in with Tommy Munch's solution using a 5/16" HSS Square Bit. It came out so easy, it wasn't funny. Now, I have a follow up for your guys who don't have a new tube on hand, and your customer is in a hurry (as usual). Crank up the lathe and turn a cold rolled steel mandrel to a slip fit in and 3" longer than the tube. Use this mandrel and a brass hammer to straighten the tube. Now, with the tube on the mandrel, mount the whole works in the lathe and face the broken end square and rethread (52 tpi). Remove 1/2 coil from the action spring, and the gun will function perfectly again.

- Freddy Mac Johle, Archer City, Texas

### **BROWNING A-5 MAGAZINE CAP TOOL**

When repairing the Browning A-5 one of the first things you have to do is remove the barrel. To do that, the magazine cap is in the way. I swear they put them on with an impact wrench, so I made up my own tool. Dig out a pair of old pliers and grind out the inside of the jaws a little larger than the O.D. of the magazine cap. Soft solder brass shim stock to this surface. As with making any tool, it may take a little time, but will pay for itself many times over. One badly marred magazine cap can cost you a customer.

- Gary Thiry, Sacramento, California

### **DOUBLE BARREL RIB PLUG**

Here is another use for your Acra-Weld - mix some with Epoxy



Black and use it for a filler for that ugly gap in the end of double shotguns after cutting off the ends of barrels. Have used this several times and it stays put - and looks so much better than those gaps.

- Walter Crow, Uvalde, Texas

## DOUBLE BARRELED SHOTGUN DOUBLING, A CURE WITH A SNAPPER

As you know, doubling is usually caused by inadequate engagement of the sears with hammer notches, so both shells go off at once. To cure, disassemble in the usual manner, relieve the concave radius at the end of the sear arm so it wouldn't interfere with the convex radius of the hammer, stone hammer notches and sear arm contacts. This was on a Spanish Double 12-ga. side-by-side, but would work on any similar gun. The result of the cure was an easing of "let off" with better sear and hammer notch engagement. And now the "Snapper". I saw an "old timer" have "doubling" problems with a Francotte Double Ten Gauge. He tinkered with it (the trigger and sear mechanisms) loaded both barrels and fired one barrel. Both barrels let go, the report was loud, shock was great and the gunsmith was so shook I never have forgotten the look on his face altho this happened years ago when I was just a pup. So - I load the Right barrel with a regular loaded shell, but the Left barrel I load with a shell that is primed only - no powder or shot. This way you can test to see if you have cured the problem or not, but don't get the shock of both barrels at once slamming into your shoulder. To test the left barrel, put the standard shell in that one, and the primer-only shell in the right barrel. Really saves getting yourself beat up, besides saves lots of shells - which cost more than primed empties!

- Thomas Robinson, Baltic, Connecticut

## WHILE AT THE RANGE

Two hunting buddies - and the local know-it-all were out at the range one weekend. After a series of rounds were fired, the first guy hollered for a cease fire to change the targets. The Know-It-All decided to tag along and see just how good these guys really were. When they got to the back stop, the Old-Timer pulled down his target and was giving it the critical once-over when the K-I-A leaned over and asked, "What kind of gun are you shooting?" "An old Smith five screw," he answered. "What caliber?" "A .357." "A .357 Magnum?" he asked. "Yep, a .357 Magnum." At this, the Know-It-All looked at the Old-Timer, at the target, and the Old-Timer again and snorted in disgust! ".357 Magnum. Hell. I've got



a .38 Special that'll make holes as big as that!", and he stomped back to the car.

- *Paul Cassel, Casper, Wyoming*

### **FORCING CONE REAMER ON SHORT BARRELS**

I have had very good results using it on the short barreled shotguns, such as the many so-called riot guns presently being sold, by cutting the cone about 1/4" deeper than usual. As you know, most of these guns have some degree of choke, and I've been able to get excellent patterns out of these short barrels. One of my customers had a Rossi hammer gun and he was using it on the skeet range - I had lengthened the chamber with that long forcing cone. He would wait until the bird would almost reach the opposite stake and then shatter it. Some of the more experienced shooters (?), who knew everything (?) there is to know about skeet shooting just couldn't take it. They would put up their guns and leave. This customer had a most caustic wit and that didn't help matters, either.

- *Bill Spratler, Odessa, Texas*

### **FOREND INTERCHANGEABILITY**

The forends for the 12 ga. 2-3/4" Browning Model A-5; Remington Model 11; and Savage Models 720, 745, and 750 are all interchangeable.

- *Gary Thiry, Sacramento, California*

### **FOREND TUBE NUT REMOVAL**

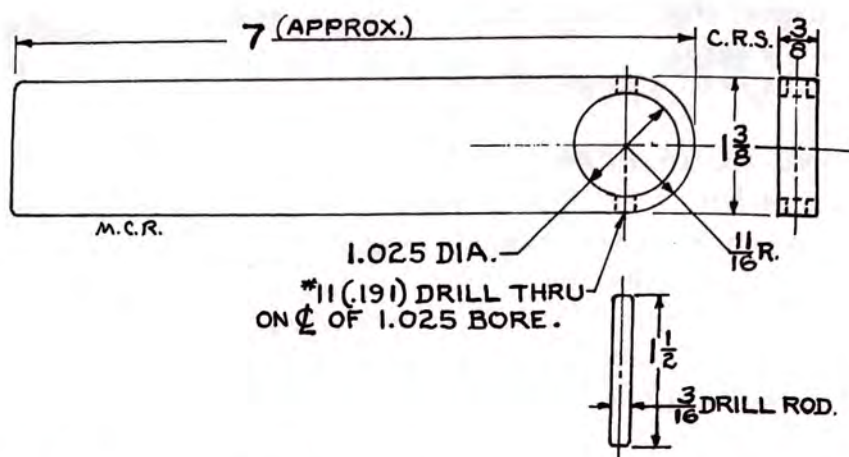
Recently a High Standard pump shotgun came in the shop for repair that involved the disassembly of the slide. Unfortunately, the forend tube nut is recessed approximately 3/4" into the forend wood making removal very difficult. However, by reducing the outside diameter of a 1" pipe coupling so that it will fit inside the forend wood and cutting two tits to match the slots in the cap, a disassembly tool can be made quickly and easily. I have used this tool many times with no problems.

- *Jim Smith, Evans City, Pennsylvania*

### **HIGH STANDARD SPANNER WRENCH**

I have found the following tool very useful for removing the magazine tubes on High Standard and J.C. Higgins autoloading shotguns. Some of these tubes are stuck tighter than the proverbial "Bull's butt in fly time", and especially the ones made from aluminum. They can be damaged by using a pin or spanner type tool in the four holes in the front end when attempting to loosen it.





By slipping this tool over the end, aligning the holes in the tool and the holes in the tube, and inserting a 3/16" dowel pin or length of drill rod, the most stubborn one can be broke loose.

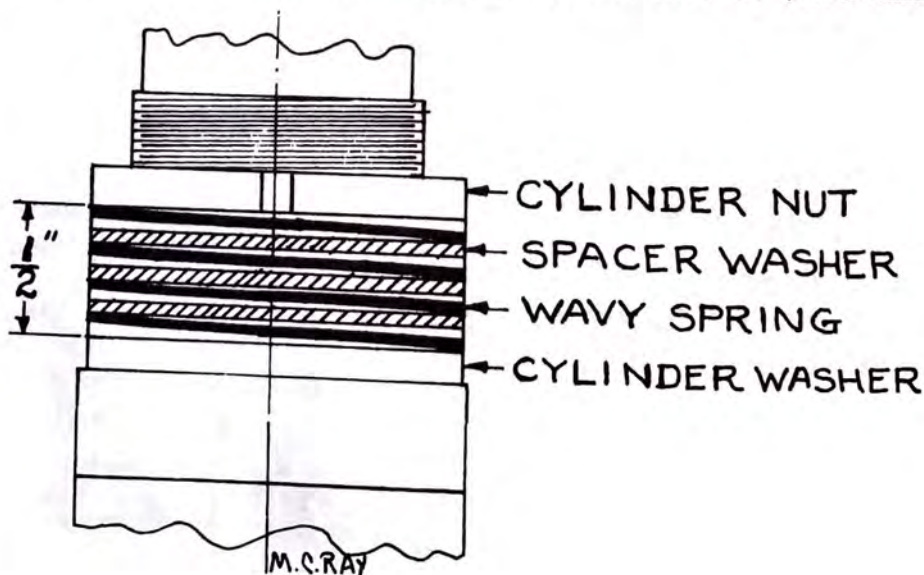
The wrench is restricted to a quarter turn at a time before removing the pin and indexing the tool 90°, but as the thread has a course pitch, a few times will have it to the point where you can screw it out by hand or with a pin punch.

Material dimensions are not critical. I used the ones that I did as that is what I happened to have handy. It could also be made by turning a ring 1-3/8" O.D. x 1.025" I.D. x 3/8" to 1/2" long in a lathe, drilling the cross hole, and welding on a handle. The main thing is to get the 3/16" hole on the center line of the 1.025" hole so the pin can go through both sides of the tube and wrench.

- Tommy Munsch, Prior Lake, Minnesota

### J.C. HIGGINS MODEL 60 OR 66 CYLINDER ASS'Y

Once in a while a J.C. Higgins Model 60 or 66 (Hi-Standard



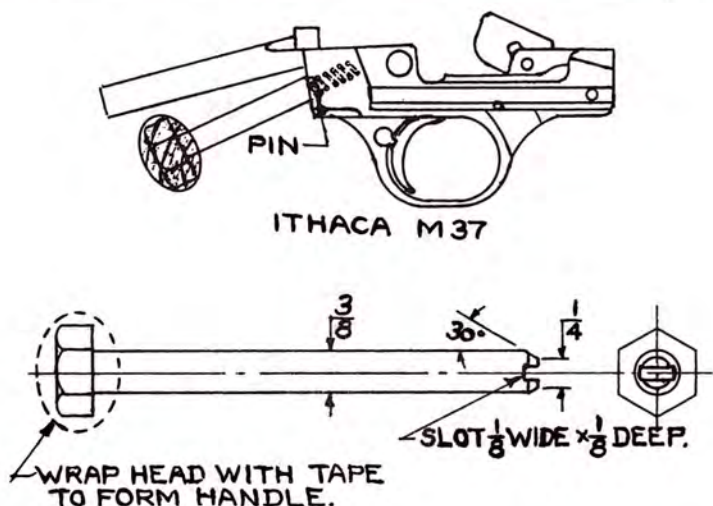


Supermatic C-100) will come into the shop in a paper bag, or the complete gun with the cylinder assembly incorrectly adjusted by the customer's brother-in-law, or son (never the customer). The total height of the assembly should be one-half inch as shown in the drawing. I have not seen this mentioned in any of the manufacturers' manuals, and it is quite critical.

- Gary Thiry, Sacramento, California

### ITHACA 37 MAINSPRING TOOL

Lock trigger assembly in vise with lead pads. Start pin in one



side, push spring in with Tool in one hand and drive pin to position.

- William T. Brown, Geneva, Ohio

### WHO'S DELIVERING THE GOODS...

People can quickly detect who's delivering the goods and will beat a path... This is well explained by Townsend Godsey, Photo-journalist, in the December, 1977, **The Ozark Mountaineer** (\$4.75 per year, Star Route 3, Branson, Mo., 65616)... The article has to do with around-the-camp-fire story swapping during a fox hunt. The "Deacon" had just listened to a story and felt he had been outdone, says Townsend, so The Deacon clears his throat and tells the following:

"Once't Vinegar and me was on a fox hunt over the Acy Lewallen's on Gobblers Knob - 'bout two years ago - you remember the time don't you, Vinegar?" "Ain't a hunt a feller's likely to fergit," acknowledged Vinegar.

"Anyway hit war a crisp night and we'uns built us a up'n a-



goin' fire and turned our hounds loose," continued the Deacon. "Hit warn't until after we let 'em go that we knowed one of Acy's bitches was in heat. Hit war quite a race and when them dogs circled our campfire and come inside the light where we could see, that old fox was a runnin' fourth."

- Townsend Godsey, Reprinted by special permission of The Ozark Mountaineer, Branson, Missouri

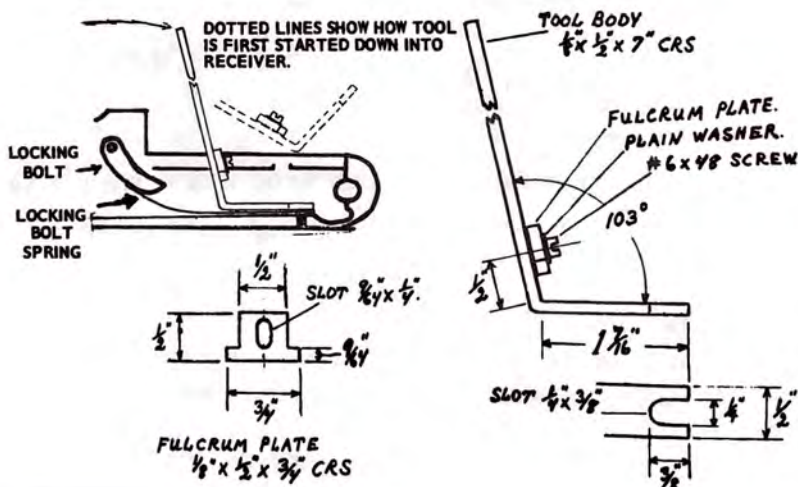
## OLD ITHACA FIRING PINS

Firing pins for I.J. shotguns (singles) are perfect for the old Ithaca Doubles if you grind off the back end.

- Eldridge Truett, Bishopville, South Carolina

## ASSEMBLY TOOL FOR IVER JOHNSON CHAMPION LOCKING BOLT SPRING

My old tool for this job worked O.K., but not well enough to suit me. So, after making this new one, which worked so well, I decided that the fellows might like to try one. The slot in the fulcrum plate provides some adjustment. In the receiver, more toward the front, on either side of the barrel lug recess, are notch-



es which provide clearance for the ejector trip pin. The ends of the fulcrum plate must enter these notches. You will find that the  $\frac{3}{4}"$  length is just a little too long. File down each end until the fulcrum plate will slip in. The locking bolt spring usually requires some fitting at the front end. Check this out. Hold receiver in your bench vise. Place spring in receiver. Now take the tool and lower the fulcrum plate down through the ejector trip pin clearance notches.



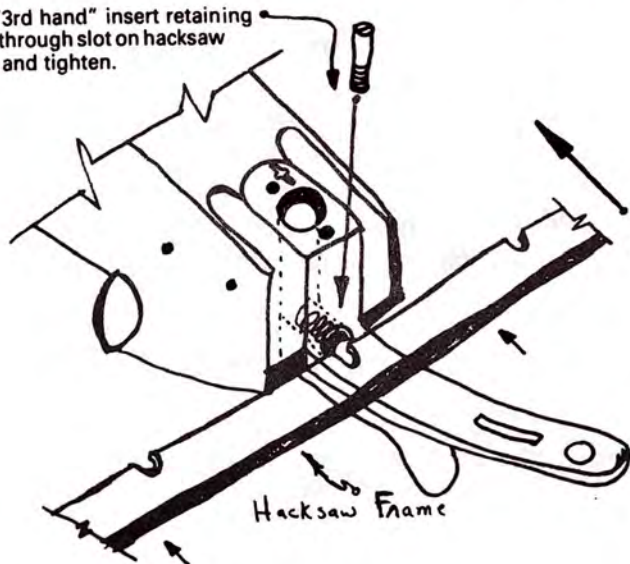
Push the tool down and then back under the side rails. Move the tool to the rear until the slot lines up with the threaded hole in the receiver. Use a slim punch to align the hole in the spring with the hole in the receiver. While slowly compressing the spring, keep aligning the holes. When the spring lacks about  $1/16''$  from being fully down, recheck the alignment to make sure that the hole in the spring is exactly centered over the threaded hole. Install the screw and tighten securely. Now the tool can easily be moved forward, up and out of the receiver. An easy job.

- William Maxwell, Hicksville, Ohio

### REPLACING LEFEVER SPRING RETAINING SCREW

To replace top lever spring retaining screw on Ithaca Lefever Nitro Specials use your hacksaw frame (if your saw doesn't have length adjusting notches, make a bar from any scrap steel. BB.)

With "3rd hand" insert retaining screw through slot on hacksaw frame and tighten.



The center notch is just right size to drop screw through after you have compressed spring.

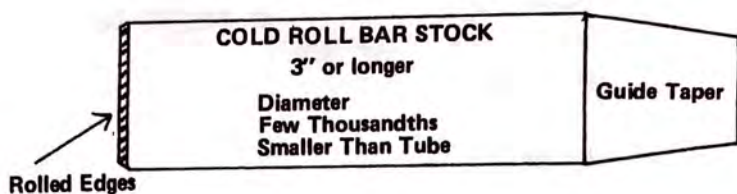
(As I sat here the thought came to me - how about putting strong nylon cord on one end of saw frame and hooking it to back of vise. Then you could compress the spring with one hand, leaving the other free to start screw. Might do the trick... BB.)

- Howard Evers, Jefferson, Massachusetts

### STRAIGHTENING MAGAZINE TUBES

Take a piece of bar stock and cut it down slightly smaller than inside diameter of tube, taper one end to act as a guide. Drive





through tube, pressing out dents. On bad ones I have heated tube and tapped area. I have used this on 12 ga. and 20 ga. shotguns, and also on inside and outside tubes on .22 rifles. (One had been shut in a car trunk lid - my, was it bad!) When season is on nobody wants to wait for parts, and also some are obsolete. Have found above plugs interchange with several models so you don't have to turn a new plug each time.

- William J. Davenport, Osceola, Iowa

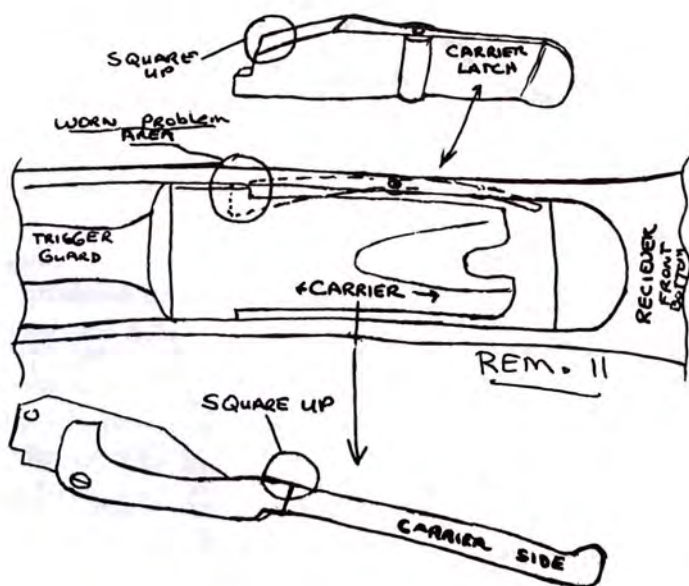
### REMINGTON MODEL 11 WON'T STAY OPEN

If you ever come across a Remington Model 11 that won't stay open after the last shot, check the carrier latch spring carefully. I found a weak one the other day that caused a lot of headaches before I replaced it. It seemed the jar from the barrel going forward was enough to slip the latch over and release the bolt.

- Jim Younce, Jr., Belhaven, North Carolina

### CARRIER LATCH MALFUNCTION

Occasionally a Rem. Model 11, Stevens 720 or Browning A-5





will come into the shop because the owner complains of a loaded shell dropping out of the bottom of the gun. When this first happened to me, I studied the gun for a long time. Then I noticed that when the gun is in battery position it was possible to press the carrier up to the bolt (if carrier and carrier latch have lost their squareness). Normally it is impossible for the carrier to move toward the breech except at the forward stroke of the breech bolt after the carrier has been released by the shell hitting the carrier latch. This is why it seems impossible that this particular malfunction could happen.

If you get one in and the customer complains of this happening, look to see if you can cause the carrier to override the carrier stop. If you can, then you have the answer and can easily solve the problem by squaring up the surfaces indicated in my sketch until the carrier cannot be made to override or cam the carrier latch out of the way.

- *Michael Magrill, Orange Lake, Florida*

#### A COUPLE OF YEARS AGO . . .

The wife of a good friend of mine got herself in a family way, and the husband, knowing her family well and the screwy names they had called all their kids announced that he would be naming the kid when it was born so it would not have to grow up with some crazy name. However, when the time arrived and they rushed off to the hospital, in all the excitement they were involved in an accident and he landed unconscious in the emergency room and she was rushed right up to maternity where she delivered twins. When the doctor asked her for their names to be put on the birth certificates, she explained about the agreement with her husband. But the doctor got very insistent that he have the names now, so she decided to let her brother pick the names hoping he would be able to pick names that a man would like.

When the husband got out of emergency he came up to maternity to see his wife and to find out how the babies were. She explained all about the naming problem with the doctor, so he asked, "Well, what did your brother name this one?" She answered, "Denise." "Why," he said, "that's a beautiful name, I couldn't have done better myself. And what did he name this one?" "De Nephew," she replied.

- *M. C. Ray, Cleveland, Ohio*

#### REMOVING REM. MOD. 11 BREECH BLOCK

The BOOK says: "removal of breech block from receiver - remove barrel, stock, forend, recoil spring, rings, etc., action



spring and plug w/follower, carrier and trigger assembly, as per the book". Then it says: "move breech bolt so locking block latch pin lines up with hole in receiver and drift out." BUT it doesn't say with what or from where! I can't see any space in the breech block to insert anything, much less a drift pin. AHA! - Line up latch pin with hole in receiver as instructed - turn gun upside down - receiver shell ejection port away from you - left hand grasping receiver and magazine tube (you don't have to remove) left thumb depressing locking bolt latch and spring - you'll just barely see a place in the breech bolt to insert a 4-penny finish nail (with the point cut off and smoothed up) - slide nail in - tap out pin - release left thumb pressure - locking block latch and spring is under control - remove latch and spring, slide breech block forward and out of receiver. . . . This locking block latch is the key to the removal of the breech block and its subordinate assemblies. Operating slide falls out of breech block at this time. . . Ain't it easy.

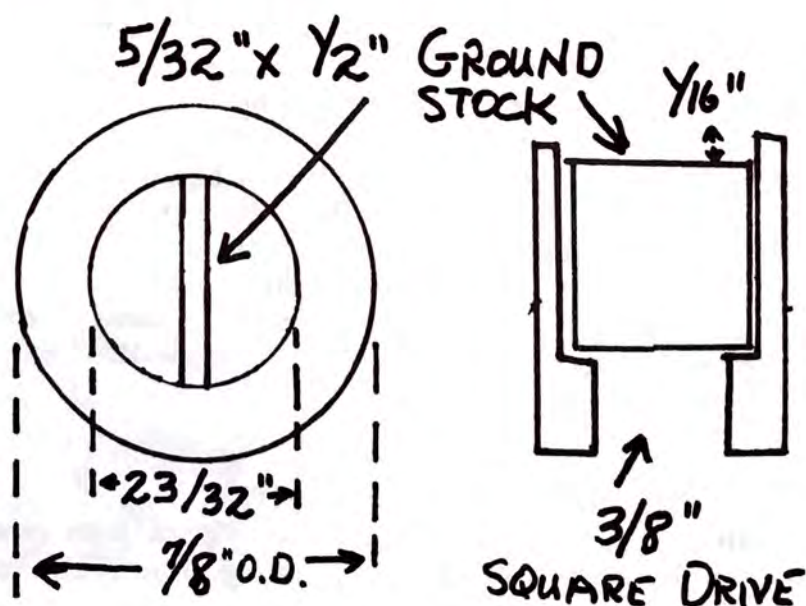
- Tom Robinson, Baltic, Connecticut

#### REMINGTON MODEL 11-48 CARRIER LATCH PIN-PULLER

After fretting several hours because I did not have one of those little puller screws to pull the pin from a Remington M11-48 carrier latch, I made a very fortunate discovery. The little tiny screw in the end of a Dremel Mototool Mandrel #402 works like a charm and makes pulling the pin easy.

- James Somerville, Salem, Illinois

#### REMINGTON 1100 ACTION TUBE NUT WRENCH



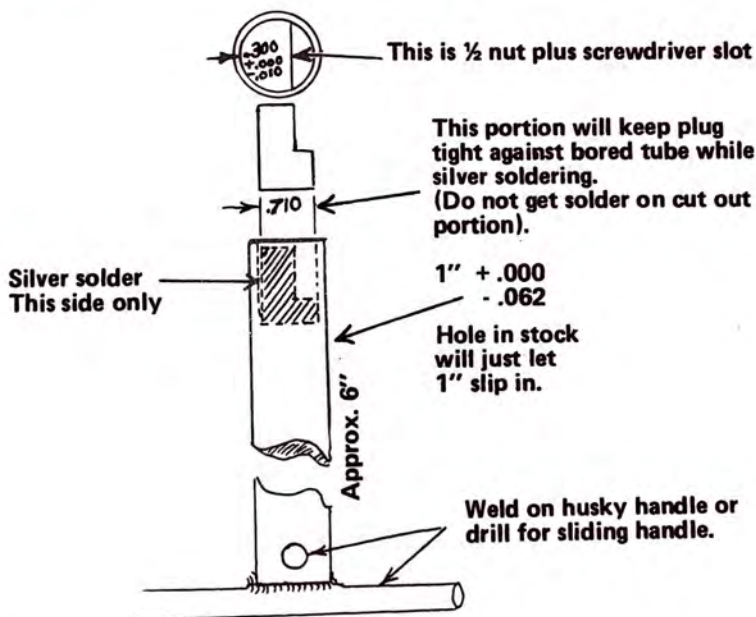


Here is a foolproof, marproof wrench for removing rusty Action Spring Tube Nuts on Remington Model 1100. Being so near the butt end of the stock, these nuts have a tendency to rust, especially in wet and salt marsh country. Take a Japanese (they are softer) made 16mm 3/8" drive socket and bore on lathe to inside diameter of 23/32" by 9/16" deep. Cut a piece of 5/32"x1/2" Starrett ground stock to fit bore tightly. Silver solder in place 1/16" below bore opening, clean and polish. Use a standard 3/8" T to drive. Assist with an application of penetrating oil.

- Harry Vorkink, Vancouver, Washington

### REMOVING BROKEN REM. 1100 ACTION SPRING NUT

I am enclosing a sketch of a tool I just made, which worked smoother than a school marm's leg. It may get someone else out from between that rock and a hard spot. A dealer brought me a



Remington 1100 on which he attempted to tighten the stock, and as a result, split the action spring tube nut. When making tool, the main thing is not to let silver solder flow around where nut will fit up in tool, as these dimensions must be kept close. These nuts are tight, and I don't believe a cross pin through a hollow tube would do the job in this case.

- Cliff Kroll, Lanark, Illinois

### STAKING REMINGTON SHELL STOPS

One of those little irksome jobs which shouldn't amount to



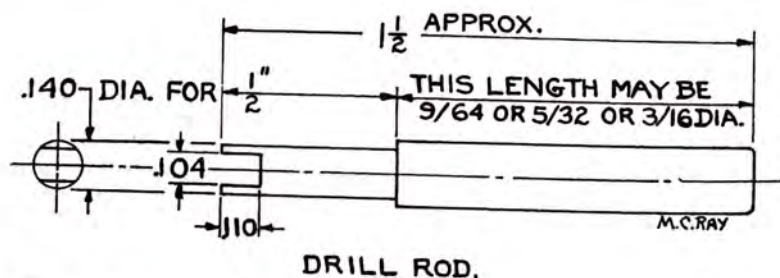
much, but always runs into more than it should is staking the shell stop into the receiver of a Remington shotgun - 870's, 1100's, etc. As you know, Remington has a beautiful drawing of an off-set staker for this job. My trouble has always been that if it was hard enough to take the gaff, it tended to break; if it was soft enough, sooner or later it bent and marked the outside of the receiver!

Tonight when the job arose, I sat down with a cup of coffee, and seeing that my last off-set staker was out of action, decided to think out the problem. Two cups later, Eureka!, it came, and it works. 1) Take a steel BB shot, a good visegrip pair of pliers, one of Uncle Sam's most equable coins... a penny - and you are in business. 2) Position the shell stop and hold in place with a small "C" clamp. Lightly stake with a center punch on the lower (available) portion of the receiver. 3) Now, smear a bit of heavy "stickum" on the spots to be indented inside the receiver - I use our Micro-Lube for this job, by the way. Position the steel BB on the inside over the spots to be staked. The "stickum" holds the BB in position. Place the penny on the outside of the receiver to protect the finish. Now, open up the vise grips and clamp them down on the steel shot inside the receiver and the penny outside the receiver. By setting this clamping action just right, you can do the best job of staking you ever saw in an absolute minimum of time - much superior to what you can possibly do at your very best with the 45° staking tool.

-John Van Noy, Las Cruces, New Mexico

## REMINGTON SAFETY PLUNGER SPRING TOOL

Having always had varying amounts of trouble reinstalling the safety plunger spring in the alloy trigger guards of the Remingtons such as the 1100, 870, etc., I made up this little tool. After



inserting the plunger and spring in their hole, align the slot in the tool with the retaining pin hole, force the spring down below the pin hole, insert pin through its hole and slot in tool, and the job is done. No jamming of the spring and pin; no springs flying around the shop; no cuss words. It's great. (Note: although the two prongs



of the tool are relatively thin, the drill rod is tough enough to resist bending with reasonable care.)

- Tommy Munsch, Prior Lake, Minnesota

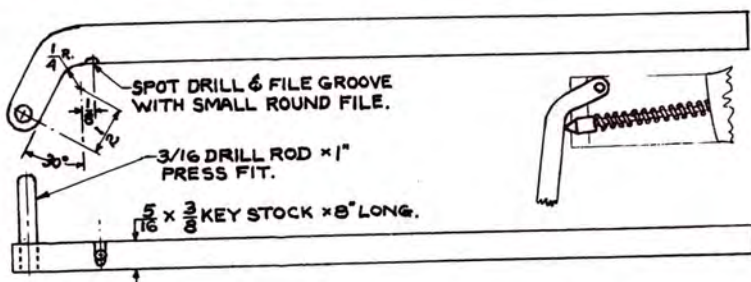
### SEEN ALONG THE ROAD...

Between Greensboro and Tuscaloosa, a sign reading: "Fresh beef raped and frozen."

- Vern's Gunsmithing, Thomasville, Alabama

### SAVAGE 94 MAINSPRING INSTALLING TOOL

The 94 has a coil mainspring with a tapered follower sleeve on the back end. Putting these springs back in place results in some

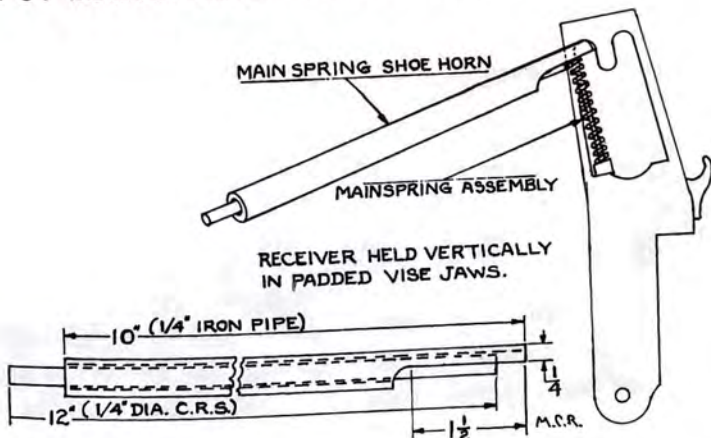


conniving and usually a little cussing since they are hard to hold to compress. The tool I made up is shown in the drawing. It worked so good for me I'd like to pass it on to the rest of the fraternity.

To use: remove the top lever spring and hook the dowel pin in the top of the frame; center the pointed sleeve on end of the spring and follower in pocket in round groove and pull the handle around until you can push the spring off the tool into the frame.

- Ted Pugsley, Pinckneyville, Illinois

### SAVAGE 94 MAINSPRING "SHOE HORN"



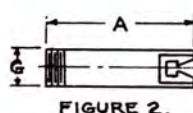
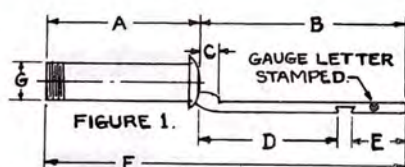


Here is a sketch of a tool that I use to install mainspring assemblies into receivers. I place a receiver in a padded vise vertically, insert notched pipe into the receiver, then install mainspring assembly. Holding a slight downward pressure on the tool, tap the following rod with a hammer. Increase downward pressure gradually until level, then "tap" mainspring into place.

- Bill Davenport, Osceola, Iowa

## IDENTIFYING SAVAGE, STEVENS & SPRINGFIELD OPERATING BARS

Over the years Savage, Stevens and Springfield have had many different operating handle bar assemblies. There are two types: one is a complete assembly (fig. 1), and the other is a tube that takes a bar and front collar (fig. 2). Both types are used in all three lines of slide action shotguns. On the front end of the type shown in fig. 1, the bar has a letter stamped. This identifies the



M.C.R.

PART NUMBER	FIG.	A	B	C	D	E	F	G
A30J-343J	1	7 1/8	7 1/8	.510	5 1/8	1.872	14 1/8	1.065
A30J-343M	1	7 1/8	7 1/8	.463	5 1/8	1.872	14 1/8	.934
A77M-343J	1	7 1/8	7 1/8	.510	5 1/8	1.872	14 1/8	1.060
A77M-343M	1	5 1/8	7 1/8	.520	5 1/8	1.872	13 1/8	.934
A77D-343K	1	5 1/8	7 1/8	.485	5 1/8	2.175	13 1/8	1.000
A77D-343J (GBS)	1	7 1/8	7 1/8	.510	5 1/8	2.180	14 1/8	1.060
A30C-359J	2	7 1/8						1.054
A30C-359M	2	7 1/8						.938
A67C-35 M	2	5 1/8						.938

gauge. If it does not have a letter, chances are that it is of an obsolete Model.

The letters and gauges are as follows:

J is 12 ga.

K is 16 ga.

M is 20 ga.

N is .410 cal.

A part number such as A30J-343M which ends with an "M" means that it is a 20 ga. The dimensions given in the following chart are rough and may vary slightly between identical parts, however, this information is meant to identify the operating bar so that the proper replacement may be ordered. Some parts were not

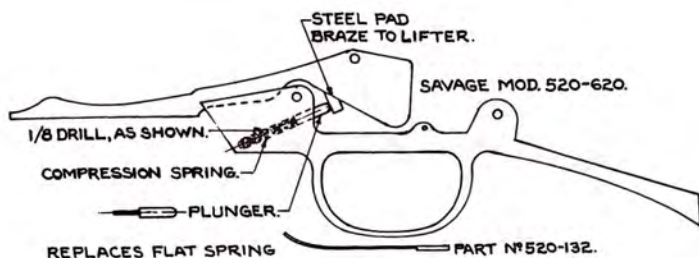


in stock at the time the chart was made up and therefore no dimensions are shown.

- Gary Thiry, Sacramento, California

### SAVAGE MODEL 520-620 MODIFICATION

I think this works better and is more reliable than the manufacturer's design on the Savage Model 520-620 slide action shotguns because it does away with the flat spring (part no.



520-132). Drill a No. 31 hole in the webbing of the trigger guard at a similar angle as shown in the drawing. Insert a small 3/4" long coil spring and plunger in this hole. Then weld a steel block on the tapered edge of the lifter. Make the block about 3/8" high for the spring loaded plunger to act against it.

- Bob Kellison, O'Fallon, Missouri

### WEAK SINGLE BARREL ACTION LOCK SPRINGS

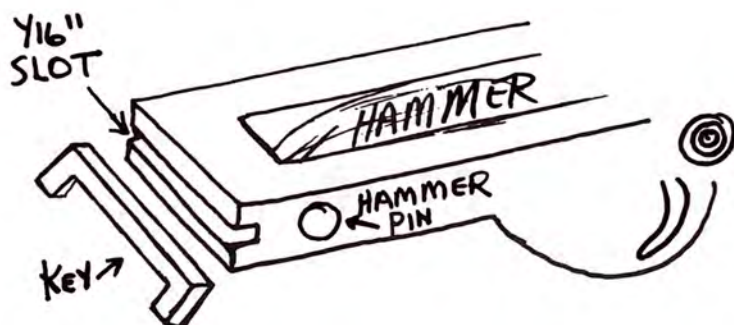
You recollect those cheap, break action, single tube shotguns? When they get so worn out that they break open on firing, it is time to junk them. Every now and then a fellow comes in willing to pay the price for repairs 'cause it has sentimental value, or some other silly thing. Mostly the spring that holds the action lock forward has weakened to the point where it cannot hold tension against the recoil forces and allows the action to break open. The cure for this is to drill and tap a hole in the frame where the spring seats, insert a bolt to adjust the spring tension, cut the head off the bolt, slot the bolt to accept a screwdriver, adjust the spring, charge the fellow a fair price, and get the gun and the customer out of the shop before any of your regular customers see the old Zulu and razz you to death. I admit it seems a bit of work to do, but it takes 10 good men and 5 right hands stronger than mine to put a new spring in that is strong enough to hold the action closed. AND I like to eat, and one customer's money is as good as another's!

- Fred Etter, Pembroke, Ontario, Canada



## SEARS-ROEBUCK SHOTGUN REPAIR

Some years ago, Sears-Roebuck put out a pump shotgun that appears to have a similar design as the Remington Mod. 31, but has an aluminum trigger housing assembly. The two little lugs on the front end of the trigger housing frequently break off, causing



the housing to drop away from the receiver at its front end. The easy and best cure for this is: Cut a 1/16" slot across front end of guard as shown. Make a simple "key" to a snug fit for grooves in receiver and guard, then "trap" key in place when guard is assembled to receiver. Works beautifully and is a lot stronger than the original factory set-up.

- Bob Kellison, O'Fallon, Missouri

## ON PROFANITY...

The local newspaper editor (a very good K.C.) puts it this way: - There was this very beautiful convent school run exclusively for the daughters of the most elite. The sheltered life, the surroundings and atmosphere just right to create nothing but genteel womanhood. Suddenly, and without warning, the adjoining property was purchased by a combine and a high-rise apartment building put under construction. The noise, dirt and confusion was like a bomb to the convent, but worse of all was the language of the steel workers. As the height of the structure increased the language carried over and filtered into every room. Finally, the Mother Superior could stand it no longer and paid a personal visit on the construction boss. "We can stand the noise - we can stand the confusion - we can put up with the dust and dirt," said she to the boss, "but please, you must do something about the foul language your men are using. It is most embarrassing to our girls and simply horrifying to the sisters." The boss tilted back his tin hat,



scratched his head for a moment and replied, "Ma'm, I can understand all this, but my men are hard working fellows, rough and ready, and they believe in calling a spade a spade." To this the Sister Superior replied: "That's just the trouble. They don't call it a spade, they call it a 'f---n' shovel'."

- John Morrissey, Editor, The Montezuma Republican,  
Montezuma, Iowa

## L. C. SMITH ASSEMBLY

Make a one-inch long pin the right diameter to pass thru the trigger plate screw hole & thread it to screw into the bottom of the top lever shaft. After you assemble the gun, you remove the pin and replace it with the proper screw. It doesn't require any extra holes in the gun.

- George Murchison, Kewanee, Illinois

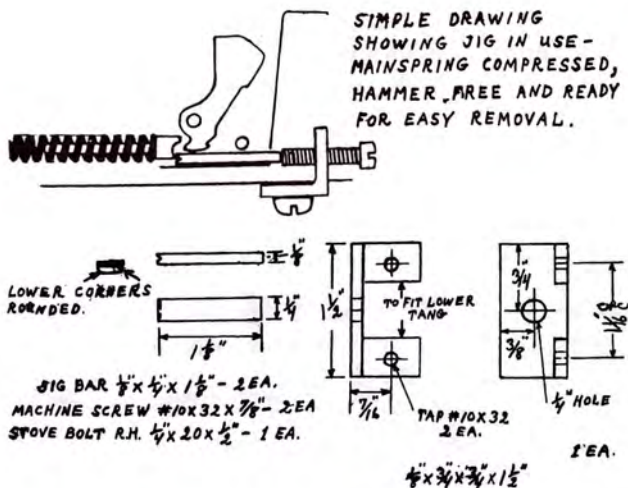
- Ken Hogg, Dothan, Alabama

## CARTRIDGE FEED FAILURE ON M-67 STEVENS-SPRINGFIELD

If the last cartridge fails to feed from the magazine on a Stevens-Springfield Model 67, check the magazine tube. Someone may have it turned end for end, and the notch for the tube end will stop the follower from coming all the way into the receiver. (Note-the tube will also rotate instead of being locked in place.)

- LeeRoy H. Wisner, Adna, Washington

## DISASSEMBLING & ASSEMBLING JIG FOR STEVENS M311





My thumbs wore out! So, I just had to do something, for those mainsprings are bull strong and my thumb would not take it anymore. I observed that the mainspring plunger overhung the lower end of the hammer about .050". This is just what was needed to make the jig work.

Instructions: Remove trigger guard, stock, sear pin, sears and sear spring. Re-install sear pin. Now try the jig bars to see if they will easily slide under the sear pin and hammer. If one will not, just make another from 3/32" stock. These receivers are castings, and they can easily vary 1/32". When making the jig bars, file the small "V" notch close to the top to be sure of contact with the mainspring plunger.

With the sear pin in place and the jig bars in position, install the angle iron jig frame using the front trigger guard screw hole. Now, turn in the #10x32 screws to compress the mainsprings. When the hammers are free from mainspring pressure, it is a very easy job to remove them by driving out the hammer pin and a very easy job to re-install without cussing!

- William Maxwell, Hicksville, Ohio

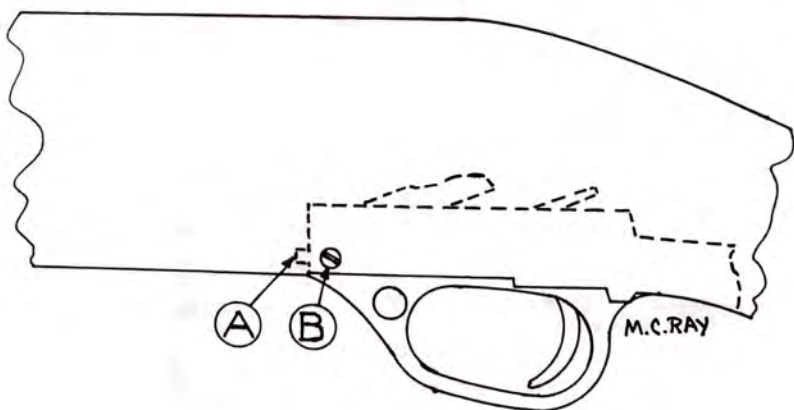
## STEVENS STOCK SCREW HOLDER

To get the short stock screw started in the plastic stocked Stevens shotgun/rifle combination, I use a piece of 3/8" rubber hose over the screwdriver shank to hold everything in place and center the screw. I think any lock-type screwdriver that the hose would fit, will work.

- Sissom's Gun Repair Service, Morrison, Tennessee

## TRIGGER GUARD REPAIR

Some of the arms manufacturers are making slide action shotguns with aluminum and plastic trigger guards. Many of these guards are only held in the receiver by two small projections on



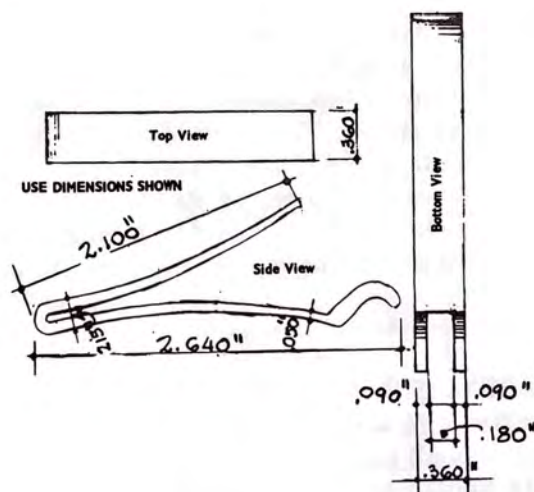


the front of the guard (A) and a pin in the rear. Due to the plastic or the aluminum being jammed into the harder receiver, these projections break off quite often. Replacement guards are expensive and usually hard to come by. And, if, by luck, you can locate one, chances are that it won't fit well without a lot of time consuming hand fitting. I've installed two 6-48 fillister head scope base screws, one on each side of the receiver at point B to hold the old trigger guard in place. Before drilling and tapping the receiver and guard, make sure the screws do not interfere with the workings of the guard. Make sure that the holes are aligned with each other and, for a professional job, counterbore the holes in the receiver so that the screws are flush with the outside surface. Not only do you end up with a good looking job, but you also use the screws to their maximum strength.

- Gary Thiry, Sacramento, California

- Ed Berntson, Fridley, Minnesota

# **HAMMER SPRING, WINCHESTER 10 GA. LEVER ACTION SER. NO. 50493**



-(First time ever in 42 years, but we lost name of contributor. Let us know so we can give you credit in the next printing, please!)

DEAR SIR...

The letter below is an exact copy of the original, written in pencil, which is on file in the Claim Agent's office of the Rutland



Railroad, Shaftsbury, Vermont. The letter was written in all seriousness, with no attempt to be funny, by Simon Trippe, RFD, Shaftsbury Creek, Vt. . . . "Mr. Faulkner, Shaftsbury, Vt. Dear Sir - Your railroads rund over my bull at the 20 mill poss on Wednesday. He air not dead but mout as well be and I want your sexion boss to repote him ded and pade for. He mash out both seeds leafing mity little of his bag. Hit teared out a pease of skin a foot square between his pecker and nabul, he air totally unqualified to be a bul and he air mamed up to bad to be a steer and he air to dam tuff for beef so I want you to repote him ded and pade for. Yours ansorofe (Signed) Simon Trippe. P.S. He were a red bul but he stans around looking mity dam blew since you rund over him."

- W. O. "Chris" Christensen, Toledo, Oregon

### **FIRING PINS FOR 16 GA. MODEL 12's**

If you have pins on hand for the 12 Ga. Model 12 and someone comes in with a 16 gauge, all you have to do is grind and shape the rear of the 12 ga. pin to the proper over all length to match the 16 ga. pin, and they will be identical.

- Ben Newman, Agency, Iowa

### **ROUGH TRIGGER PULL ON A MODEL 12**

Quite often I have a customer bring in a Winchester Model 12 with a rough trigger pull. Most always this is caused by a bent or dog-leg in the trigger spring. This is usually done when installing the spring, which can be a real chore sometimes.

The trick I use is to take a pin of about one-half the diameter of the trigger pin, which lets me see the spring to get into the proper position. Then install the regular pin, and the spring will be straight as it should be.

- Kenny Lowe, East Alton, Illinois

### **MODEL 12 BARREL TIGHTENING**

A customer had a Model 12 that had an extremely loose barrel. The adjustment was all taken up in it so I ordered a heavy draw sleeve for it. He wanted to use it until the new sleeve came in. As it was very loose I thought anything to tighten it was better than nothing while waiting for the new sleeve. I removed the adjusting sleeve and dressed off the back of it to allow it to make one more turn. I was pleasantly surprised to find that the difference between the internal thread and the position of the interrupted thread on the sleeve was such that with the extra turn the interrupted thread was correctly positioned and had a nice tight fit. This may not always work but the Model 12 will be around a long time, and

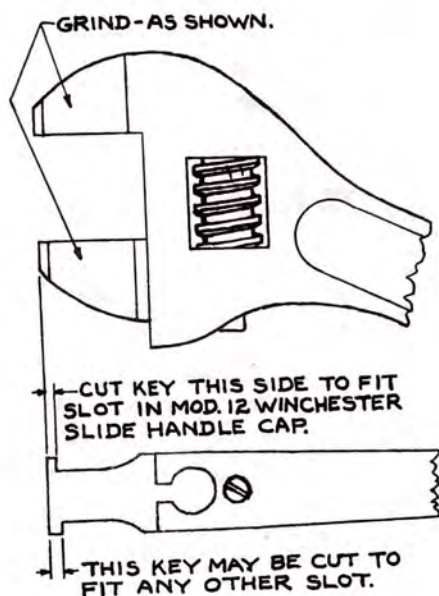


as parts are going to get more difficult to obtain, it might well be worth remembering.

- *Earl McMann, Trenton, Michigan*

### MODEL 12 SLIDE HANDLE CAP WRENCH

This wrench is made from any good grade 10" or 12" crescent wrench. If ground as shown in the drawing, it will remove the slide



MAKE FROM ANY GOOD GRADE  
10" OR 12" CRESCENT WRENCH.  
TO REMOVE SLIDE HANDLE CAP FROM  
ANY 12, 16 OR 20 GA. MOD. 12 WINCHESTER.

handle cap from any 12, 16, or 20 ga. Winchester Model 12 shotgun.

- *H. C. Nolan, Pleasant Hill, California*

### NO-SCRATCH RE-ASSEMBLY ON MODELS 12 & 97

Have you ever had a momentary "blackout" and forgotten to install the action slide spring on the magazine tube of a Model 12 or 97 before bluing? Then tried to "Wrassle" on the confounded spring without scratching the new blue job!

Try this for an assist - take a thin piece of plastic, such as a pocket drill and tap chart, and wrap it around the magazine tube. Place the action slide spring on the magazine tube, over the plastic card, and slide it on. No scratches or lost temper. Works great too for installing the magazine band on the barrel.

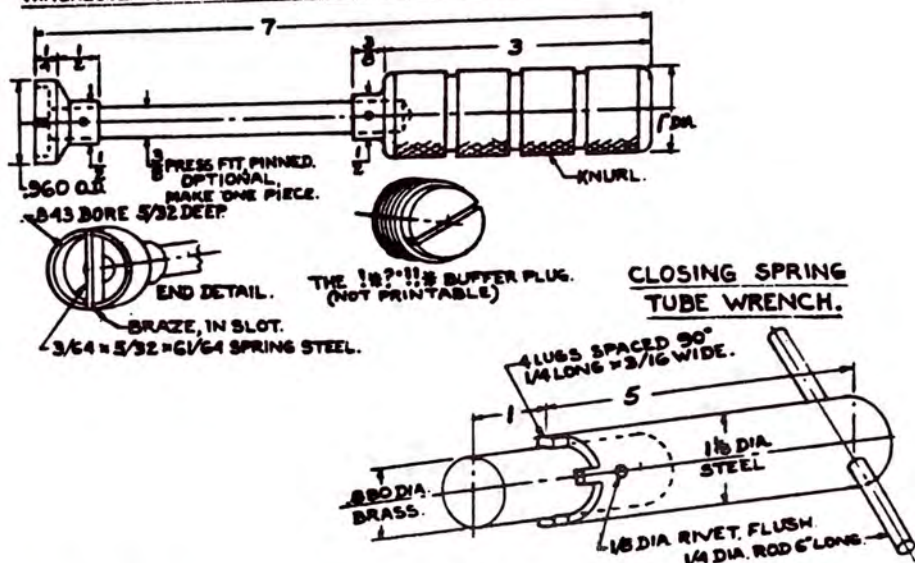
- *Dick Thaxton, Broomfield, Colorado*



## WIN. MODEL 50 & 59 BUFFER PLUG INSTALLATION TOOL

After having a buffer plug fly across the shop and spending the rest of the day cleaning the shop before locating it, I decided it was time to make up a tool to prevent this from happening again.

WINCHESTER MODEL 50 & 59 BUFFER PLUG INSTALLATION TOOL.



The enclosed drawing is what I finally came up with, and I haven't lost one since.

To use, just turn plug out 'til threads show. Then install tool and finish removing the plug. When re-installing, the tool will hold the plug stable and prevent cross-threading. The companion tube wrench shown also makes tube removal and installing easy.

- Bill Johnson, Mantua, New Jersey

## OLD GUNSMITHS...

Never Die - they just lose their headspace. (Distance from ear to ear -)

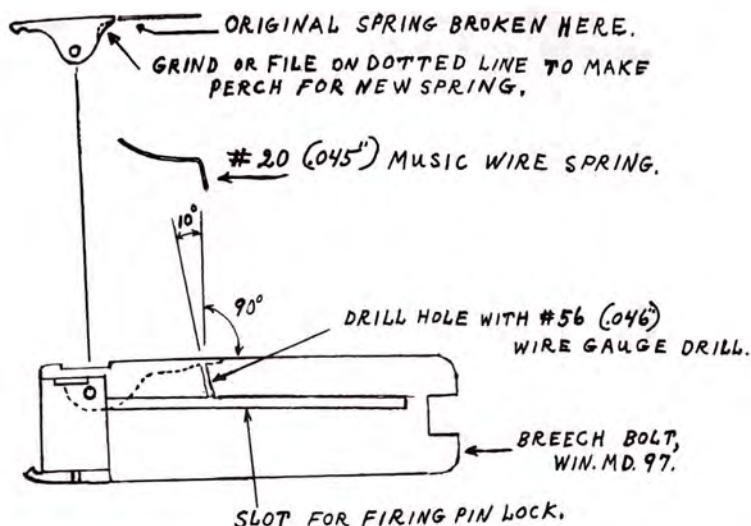
- Arthur McIntosh, Seattle, Washington

## REPLACEMENT SPRING FOR WINCHESTER MOD. 97 LEFT HAND EXTRACTOR

If you have a Win. 97 L/H extractor which is OK except for broken spring, fer gosh sakes don't throw it away. I surely wish I had all that I've thrown away!! All you need do is install a new spring, and do a little stoning and a bit of re-shaping of the extractor where the spring bears.

Remove bolt from receiver. Remove left extractor. Remove firing pin lock from bolt. Drill hole for new music wire spring 10° for-





ward of vertical (see drawing). Drill this hole clear through into firing pin lock recess. This is in case the spring should ever break - you can poke out the broken shank). Be sure to remove burrs where drill breaks through into recess. Also, counter-sink the hole a small amount so that new spring will not have to flex over sharp edges. The new spring should be installed so that it sets a little below flush with bolt surface. Also, be sure shank does not protrude into firing pin lock recess. Oxpho-Blue new spring just before final assembly.

When original spring breaks, it leaves a very sharp corner. Be sure to stone well so that extractor will slide smoothly in bolt race in receiver.

**ASSEMBLY:** Place shank of spring into hole in bolt. Spring does not need any fastening. Spring pressure holds it. Place rear end of extractor on the spring and press into place and use a "slip-fit" punch or "slave pin" to hold everything in working position. Now is the time to check for action, fit and tension. The spring tension should be quite firm. When you are satisfied, drive in the extractor pin. Assemble gun and test.

- William Maxwell, Hicksville, Ohio

## WINCHESTER 97 EJECTOR

"Pick out a fishhook with an eye about the right size, then shape the rest of the ejector from the shank," quoth that ardent fisherman and gunsmith, Vern Johnson. (Note from FB: Both Bob and Vern swear this is not a fish story; that it is not something they dreamed up to "get you off the hook"; nor is it intended to 'snag some unsuspecting young 'smith like those snipe hunting



trips of my own youth.) It is a heck of a good suggestion and Vern did send one along to prove that it works.

- *Vern Johnson, Kimberling City, Missouri*

### **SUPER X-1 SEAR SPRING**

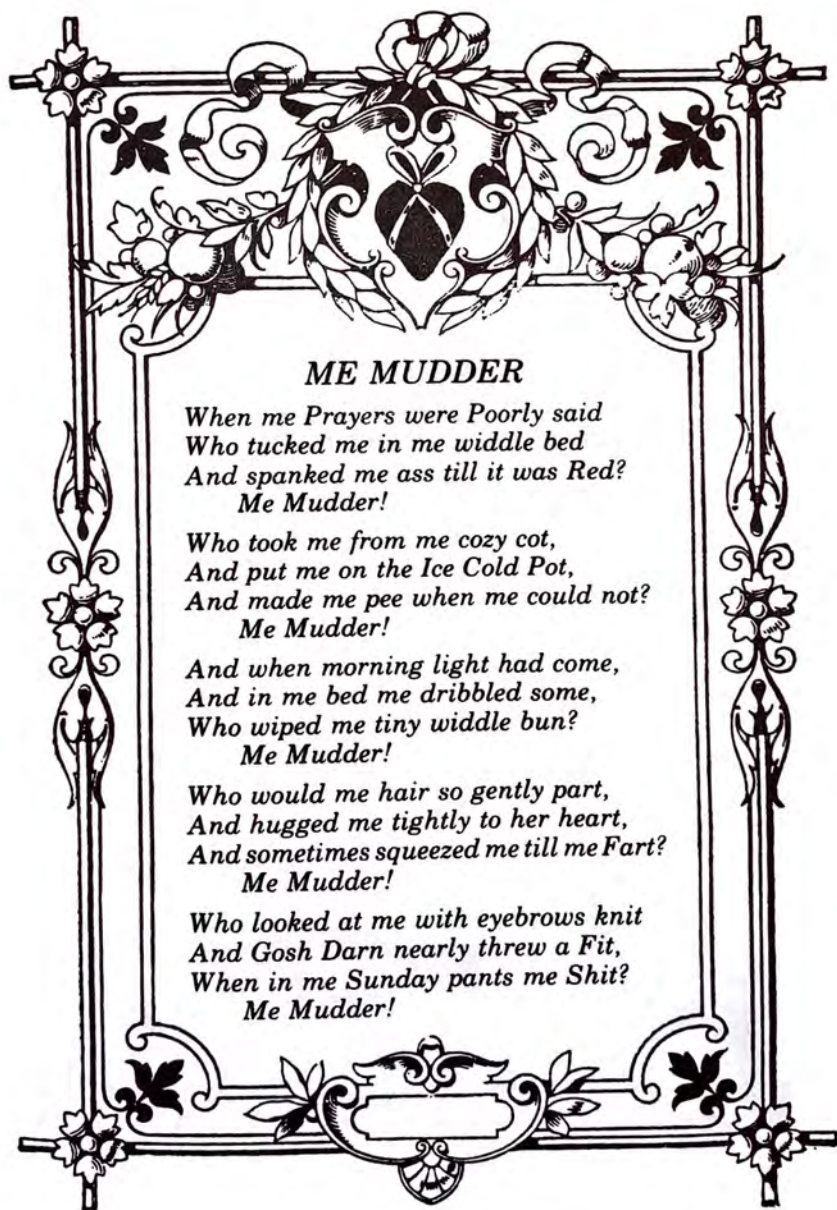
For those blasted sear springs in the Winchester Super X-1 that won't stay under the sear tip for luv nor money, I've found that drilling a #23 or so hole in the underside of the sear tip helps immensely.

- *Donald Schluter, San Diego, California*



## CHAPTER 10

## SHOP TOOLS &amp; TECHNIQUES

**ME MUDDER**

*When me Prayers were Poorly said  
Who tucked me in me widdle bed  
And spanked me ass till it was Red?  
Me Mudder!*

*Who took me from me cozy cot,  
And put me on the Ice Cold Pot,  
And made me pee when me could not?  
Me Mudder!*

*And when morning light had come,  
And in me bed me dribbled some,  
Who wiped me tiny widdle bun?  
Me Mudder!*

*Who would me hair so gently part,  
And hugged me tightly to her heart,  
And sometimes squeezed me till me Fart?  
Me Mudder!*

*Who looked at me with eyebrows knit  
And Gosh Darn nearly threw a Fit,  
When in me Sunday pants me Shit?  
Me Mudder!*



## MACHINE TOOLS SOURCE

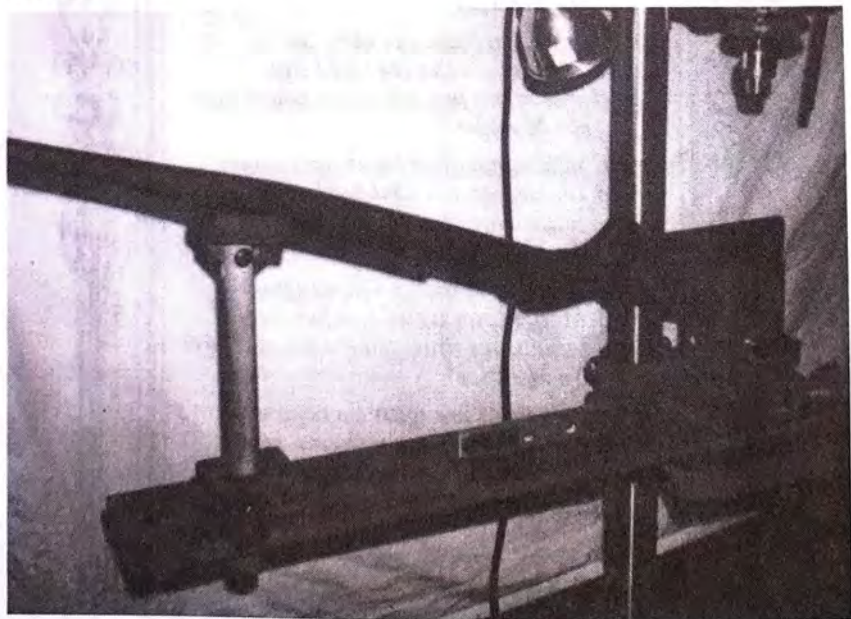
I have met quite a few gunsmiths and serious hobbyists that would like to obtain some machine tools, but can't afford new ones and don't seem to be able to find used ones. The secret is to take the initiative...ask around and advertise! Often an ad in the classified section of your local newspaper and that of your surrounding towns will usually bring something out of the woodwork. If that fails, start visiting all the machine shops in your area. Explain what you want and are willing to pay, and you might be surprised at the results.

I know, my entire shop was outfitted this way (South Bend lathe, Millrite vertical mill, Delta drill press, South Bend shaper, and other accessories). Incidentally, an advantage of this method is that you usually get some accessories with the equipment which you may not buy new.

*-John Lovallo, Lynchburg, Virginia*

## SWIVEL STUD INSTALLING FIXTURE

For those times when nobody was available to hold the stock while I was drilling to install sling swivels, I designed and built this fixture. Makes a convenient one-man job out of it now, saving me lots of time and doing a better job. The stock is clamped by the butt and the support under the forearm is adjustable up or down to drill at a right angle to the surface of the stock. The blueprints tell it all.

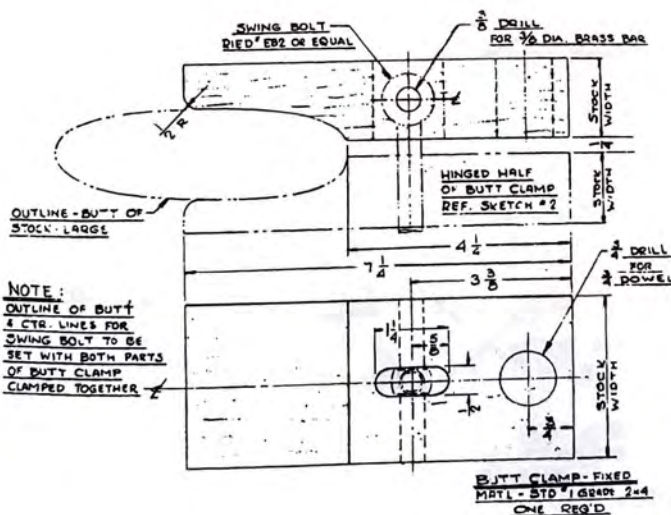




## Material List

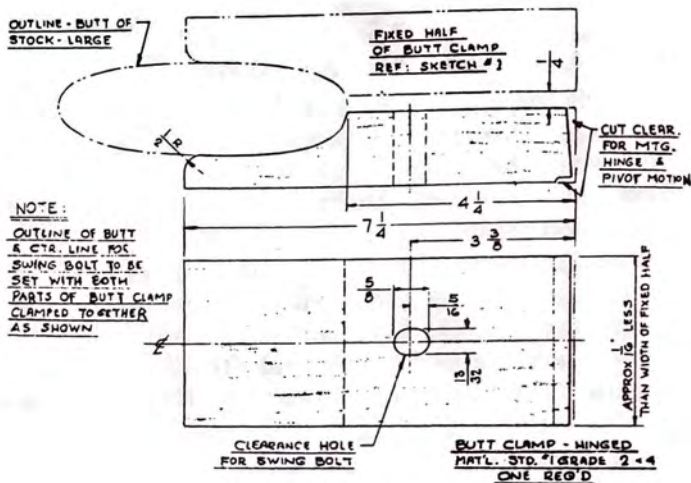
- (One) Wood - 2 x 4 - Grade #1 - Approx. 20"
- (One) Wood - 1 x 6 - White Pine - Approx. 40"
- (One) Wood - 1 x 2 - White Pine - Approx. 12"
- (One) Plywood, Marine Grade -  $\frac{3}{8}$ " x Approx. 2 $\frac{3}{4}$ " x 6"
- (One) Birchwood Dowel -  $\frac{3}{16}$ " Dia. x Approx. 8" Lg.
- (One) Birchwood Dowel -  $\frac{1}{2}$ " Dia. x Approx. 6" Lg.
- (One) Birchwood Dowel -  $\frac{3}{4}$ " Dia. x Approx. 1 $\frac{3}{4}$ " Lg.
- (One) Birchwood Dowel - 1 $\frac{1}{4}$ " Dia. x 14" Lg.
- (One) Rd. Brass - Comm. Grade -  $\frac{3}{8}$ " Dia. x 3 $\frac{1}{2}$ " Lg.
- (One) Soft Felt -  $\frac{1}{8}$ " Thick x 3 $\frac{1}{2}$ " Wide x Approx. 12" Lg.
- (One) Swing Eye Bolt -  $\frac{3}{8}$ " Dia. Reid #EB2 Or Equal
- (Two) Hand Knob - Tapped  $\frac{3}{8}$ "-16, Reid #TC-1A Or Equal
- (1 set) Spherical Washers - For  $\frac{3}{8}$ " Scr. Reid #SPW3 Or Equal
- (One) Fender Washer -  $\frac{3}{8}$ "
- (One) Plain Washer -  $\frac{3}{8}$ "
- (One) Plain Washer -  $\frac{5}{16}$ "
- (One) Carriage Bolt -  $\frac{5}{16}$ "-18 x 1 $\frac{3}{4}$ "
- (One) Wing Nut -  $\frac{5}{16}$ "-18
- (Two) Fl. Hd. Mach. Screw -  $\frac{3}{8}$ "-16 x 2 $\frac{1}{2}$ "
- (Two) Alnut -  $\frac{3}{8}$ "-16
- (Six) Fl. Hd. Wood Screw - #10 x 1 $\frac{3}{4}$ "
- (One) Fl. Hd. Wood Screw - #12 x 2"
- (One) Hinge-Brass Butt - 2" x 3" (With Screws)

## Butt Clamp - Fixed

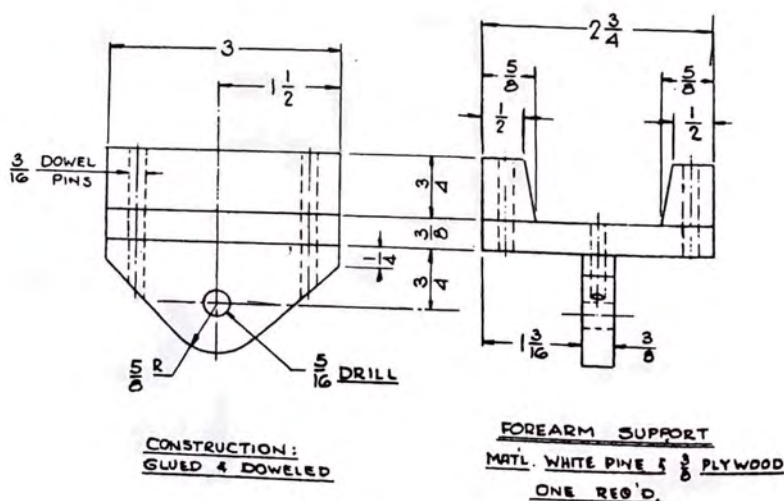




## Butt Clamp - Hinged

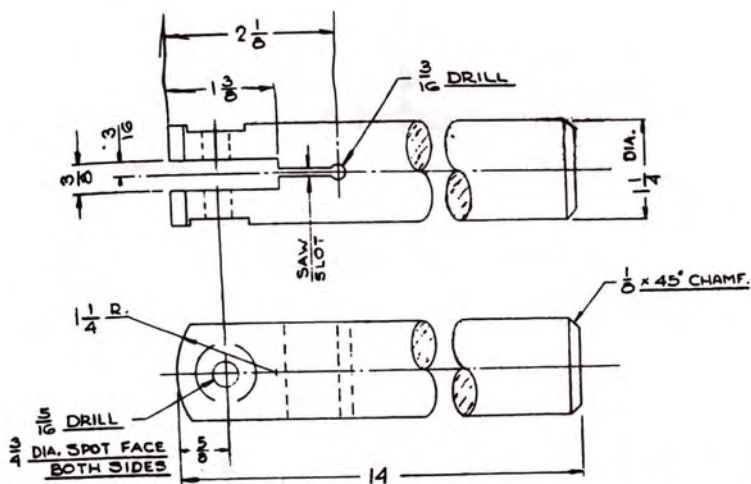


## Forearm Support



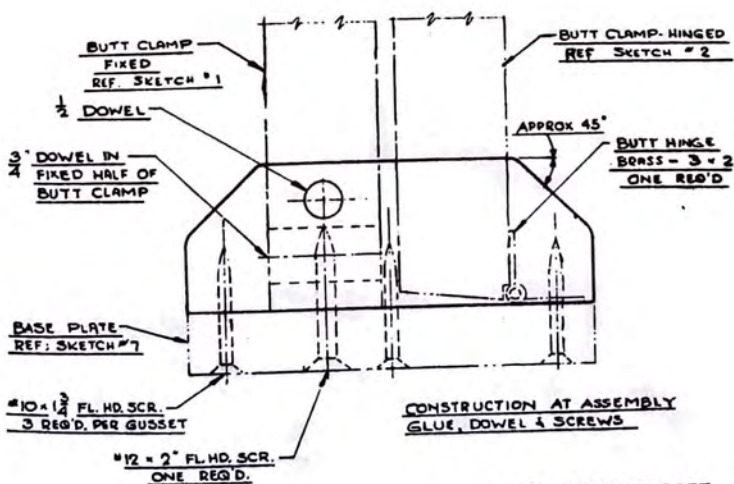


## Forearm Support Post



FOREARM SUPPORT POST  
MAT'L. 1/4 DIA. BIRCH DOWEL ROD  
ONE REQ'D

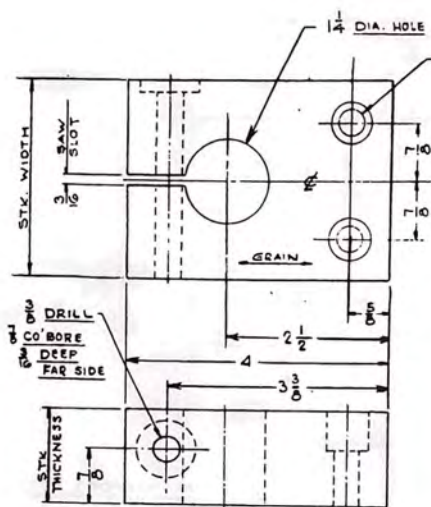
### Butt Clamp Gusset



BUTT CLAMP GUSSET  
MAT'L - WHITE PINE 1 x 2  
TWO REQ'D.



## Forearm Support Clamp



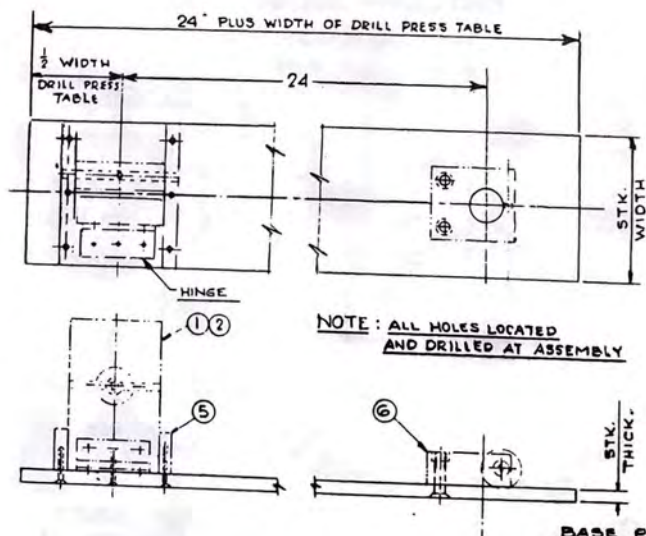
DRILL THRU  
1/8 CO BORE 5/8 DEEP  
2 HOLES FOR  
3/8 ALNUT

NOTE: THE ABOVE NOTED  
HOLES AND THE 1/4 DIA.  
HOLE SHOULD BE DRILLED  
WITH PART LOCATED AND  
CLAMPED IN PLACE TO  
ASSURE PROPER HOLE  
ALIGNMENT

## FOREARM SUPPORT CLAMP

MAT'L. #1 GRADE 2-4  
ONE REQ'D.

## Base Plate



NOTE: ALL HOLES LOCATED  
AND DRILLED AT ASSEMBLY

## BASE PLATE

MAT'L. 1x6 WHITE PINE  
ONE REQ'D

- Art Waldo, Toledo, Ohio



## **WARNING!!! - POWDERED ASBESTOS**

Avoid the stuff like the plague and carbon-tet. The stuff is vicious. It has been found that the fine dust of asbestos will settle and stay in the lungs and is a proven cause of lung cancer! If you **ABSOLUTELY** must use to make a heat dam or the like, wear a good filter over your nose to filter out some of the stuff.

- Bob B.

## **BIG NO-NO FOR G.I. AMMO CANS**

Don't store pressurized spray cans (paint, oils) in G. I. Ammo Cans - the kind that seal hermetically with the arm center clamp. A friend nearly lost a hand when he opened one after several months of storage. Seems that an undetectable small leak pressurized the ammo can and the lid nearly tore his hand off when he opened it.

- Don Tyler, Maj. USAF (Ret.), Walton Beach, Florida

## **ROLL-AROUND SHOP EQUIPMENT**

Used typewriter stands, the type with casters and brakes or the type that has a lever to let you lower the unit down to rest solidly on the floor independent of the casters, can usually be had for a few bucks from office-supply houses and second-hand furniture stores. Usually they are mechanically sound but look like hell, which is the principal reason for being traded in. All except the cheapest and flimsiest of these are adequately strong and stable for a number of shop uses. Simply by clamping or screwing a 3/4" plywood plate to the top of the stand (just to damp vibration) and then installing the bench tool, you have a mobile unit that can be rolled out of the way when you don't need it, or pulled back out to use at any time, stabilizing it by pushing down the foot pedal that raises the casters and puts the load on the legs. Many of these older stands are as heavy and massive as a water tower and would even handle such things as a small shaper or bench model drill press. Others, not quite so sturdy, will do nicely for grinders, sanders, etc. With one of these set-ups, you can wheel a piece down the hall, into a closet, or any place else out of the way and still roll it right back for use anytime. Really lets you keep a big shop full of equipment in a minimum of floor space! (And we thank you, Major. For those of you whose shop is like mine, this is the answer to a maiden's prayer for there is never enough space for the equipment.)

- Major George Nonte, Peoria, Illinois

## **BRASS JAW VISE GRIPS**

I keep a pair or two of vise grips with brass jaws around. They



hold small objects more easily, and the whole thing can be put in the big vise for steadier working. My brass jaws were made by using brazing rod, flowing it on the existing jaws and using a file to finish - smooth or with teeth.

- *Joseph Black, Del Rio, Texas*

### **LIGHTWEIGHT BRASS HAMMER**

I was plundering through my junk box the other day to find a small piece of brass to make a hammer and came across an old busted spigot (or hose bib, or faucet, or whatever you want to call it). It had a brass handle on it, and I simply drilled out the hole to accept a 3/8" hardwood dowel about a foot long. Then I flattened one of the rounded ends with a file to give both a rounded face and a flat face. It's light enough, and the handle is long enough to really get a nice whip, and it worked beautifully to straighten out some dents in a .22 magazine tube.

- *Jim Davis, Eastanollee, Georgia*

### **ALL A MATTER OF POINT OF VIEW**

Sign seen in southern gun shop: We buy old guns - we sell antiques.

- *Reid Coffield, Montezuma, Iowa*

### **LEAD BENCH BLOCK**

The best bench block I have found for putting under something I want to peen on, or bend back into shape, is a 5 pound block of plumbers lead. It comes in either brick shape or round - and just the right stuff to keep from marking a surface yet support it firmly while you are working on it.

- *Ed Moore, Greenville, North Carolina*

### **NON-SKID BENCH PADS**

For years I have used old carpeting and other materials on the bench to prevent damage to guns, but they have all proven unsatisfactory because they soak up oil, hold dust and filings and ultimately do more damage than good. The other day I tried some solid rubber truck mud flaps, and they are ideal. Come about 24" x 30", easy to clean, don't hold oil or dust, small parts are easy to pick up and don't slide around. You can buy these new at parts stores, or used from a local truck center. And, they are also portable for range repairs. They are far better than anything I have ever seen. Even better than a turtle with air brakes.

- *Bruce Donle, North Reading, Massachusetts*



## CARPET VISE PADS

Try the adhesive-backed indoor-outdoor carpet tiles. Down-right handy and you can cut to any shape.

- *Hays Trap & Field, Moweaqua, Illinois*

## WISE PADS

A little trick I found years ago was to get some live rubber from a retread shop and put it on a piece of hardwood for pads in my vise. If you can get some in your area, try it - really holds great and seems to form around the parts you are holding for extra grip.

- *Cliff Wilcox, Fargo, North Dakota*

## CORK VISE JAW PADS

The best non-marring material for holding finished gunstocks is ordinary gasket cork, available from any auto supply house in 1/4" sheets. Saw out the usual straddle-legged vise jaws from 5/8" plywood and line each face with two thicknesses for a total of 1/2". Use any good wood glue to hold the cork to the wood, or double back tape is even faster.

By draping the vise screw housing with rags you can hold a Model 21 or fine superimposed over the grip checkering with no marring. It won't mark the fine edges of a custom stock and really holds.

- *Irv Coutts, Menlo Park, California*

- *Al Guay, Lomira, Wisconsin*

- *W. S. Vickerman, Ellensburg, Washington*

## BENCH-TOP PIN VISE

I made a fixture to hold round pieces of steel for filing, dressing up slots, etc., from the chuck off an old broken electric hand drill. Removed the gear from the shaft, then ground two flats on the shaft so the whole assembly could be tightened in a vise.

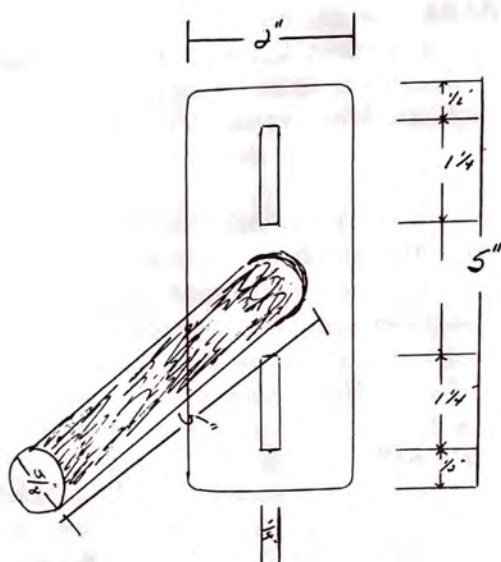
You insert the round stock, screw, etc., in the drill chuck and secure the part with the drill chuck key. It works great, holds the parts tightly without marring them, and saves the fingers.

- *Dennis Dressler, Cincinnati, Ohio*

## PANAVISE MOUNTING PLATE

For those 'smiths that have a Panavise, you also have the makings of a very nice checkering cradle. Just make an adapter plate as shown in the drawing. Remove the buttplate from the stock, and using the original screws and large washers, attach the adapter to the stock and drop into the hole of the Panavise. Use a



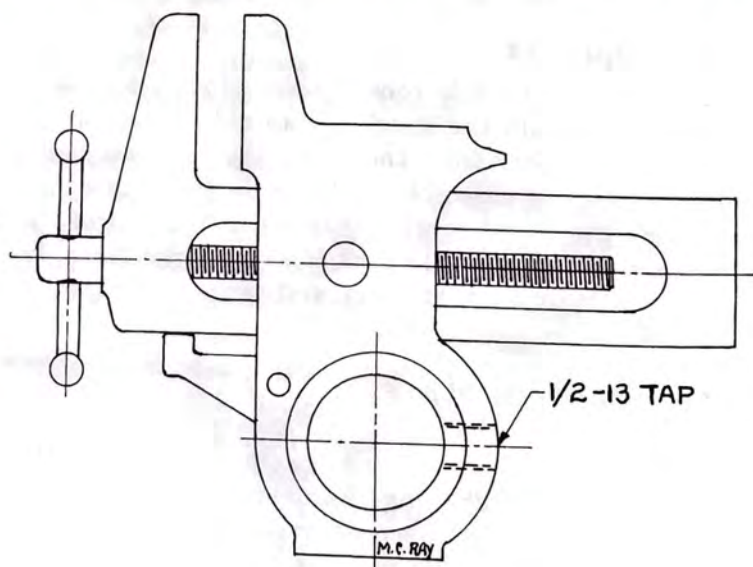


sand filled leather bag, or equivalent, to rest the fore-arm on, and go to it. You have 100% versatility.

- Dave Hepler, Pt. Mugu, California

### ROTATION-STOPPING VERSA VISE LOCK

The Versa Vise is my favorite vise, but . . . it does not lock into place if you are using any jaw pads. I drilled and tapped the main upright piece for a 1/2-13 Allen head screw (as shown in the draw-





ing), and now can lock it into position and stop the rotation whenever I want, jaw pads or not.

- Gary Thiry, Sacramento, California

### ON HIS WAY UP

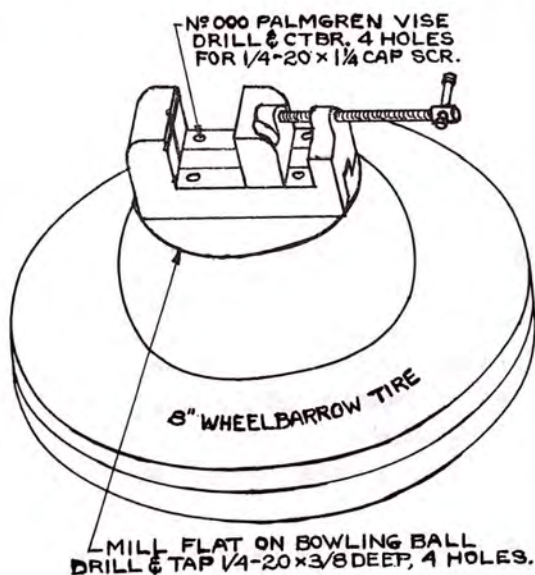
One of the big gun companies recently offered a \$100 prize to any employee who could come up with a surefire money saving idea. As I understand, the prize went to a young man who was employed as a lowly floor sweeper. His winning idea? Reduce the prize amount to \$50. Yep, that boy is goin' places!

- Fred Moulton, Washington, D.C.

### BOWLING BALL ENGRAVER'S VISE

I couldn't afford one of your excellent factory engraver's vises, so I came up with this idea. It worked very well for me.

I had a machine shop cut about one inch off an old bowling ball, then drilled and tapped it for one of your drill press vises.



Next, I set the ball in an 8 inch wheelbarrow tire so it can be set in any position for engraving. The tire can be stuffed with foam rubber, if you wish - helps keep it more stable.

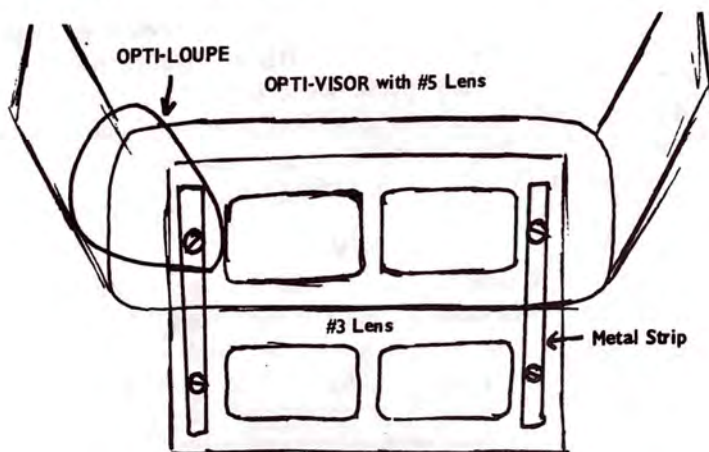
I have it mounted on a turntable, about belt high, and large enough in diameter so I can hold it with my body to keep it from moving. One could also make some kind of brake system, but it works well for me.

- C. J. Ziemkowski, St. John, Indiana



## MULTI-POWER OPTI-VISOR

I am 1/2 blind, and other 'smiths might use this outfit. Works good and besides your customers think you are crazy and won't give you any trouble when you are wearing it. I took an Opti-Visor



with the #5 lens, and hung an extra #3 lens below it with two metal strips. The two lenses of your choice plus the Opti-Loupe give you about any power you want.

- Sam Hinson, Hasty, Colorado

## EGG CARTONS FOR SMALL PARTS BINS

When I take a gun apart for cleaning, or any other reason, I use the foam egg containers to put the parts in. You have 12 little compartments so the parts won't get lost, and also a good aid in keeping the parts straightened out for reassembly.

- Hugh W. Woods, Jr., Chambersburg, Pennsylvania

## SMALL PARTS BAGS

Dan Baldwin and I were discussing the ages of our kids the other day on the phone and discovered that we both had some "lap-sitters" around still, which somehow led into what to do with the old Playtex Nurser Liners (OK...so for you ol'timers that don't know what those are - ask your own married daughters - they'll know.) and come to find out, we both had used them around the shop to store small parts. A 3 x 5 card fits into it beautifully so you can identify the parts easily, and then just fold over and staple or use a twistee. Made of real heavy plastic and durned near impossible to tear a hole in! NOTE: This is Frank B. what did the talking with Dan. Thought I ought to explain that just to quell the



uproar. Wouldn't want you guys sending Dad cards of congratulations - or should that be "commiseration". And I know what his reaction would be...like the following tale told on one of the older gunsmiths in the area. Seems his wife went to the doctor and discovered that despite all the usual rules of common sense and nature, she was in the family way again after all these years. She was pretty concerned how her husband would take the news, so she decided to call him from the doctor's office to give him the news in advance - then when she got home he would be over most of the shock. So she dialed his shop, and when he answered, she said, "Bill, this might come as a surprise to you, but I'm going to have a baby!" After a slight pause (pregnant pause, I think the fancy writers call it), he answers, "Lady, I don't know what number you dialed, but you've sure got a wrong number!" and hung up.

- Dan Baldwin, Carlisle, Pennsylvania

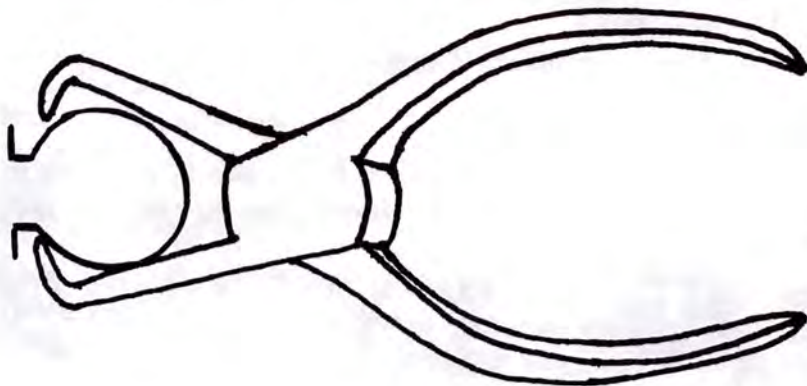
#### ASSEMBLY/DISASSEMBLY BOX

I finally learned to assemble and disassemble spring-loaded mechanisms in a suitably oversized cardboard box. Solve the problems of those "bye-bye Charlie" springs, pins, and whatever else that flies all over the shop. I know this has happened to everybody one time or another.

- Tom Robinson, Baltic, Connecticut

#### TOOL FOR INSTALLING EXTRACTOR COLLARS

A frequently used tool in my shop is one made as shown in the outline drawing. It is used to squeeze together the lips of an extractor collar while reassembling the extractor to the bolt of various rifles. I burred several collars and several extractors before making this tool; I've had no trouble since. The tool is simply made by heating the jaws of a set of long nose pliers and bending





as shown. The tips of the jaws should meet, and should be ground to provide clearance for the extractor. The temper is lost when the jaws are heated, but residual strength is adequate for this relatively light work. There might be an easier way to do this, but I never figured it out.

- G. A. Wakkinen, Waunakee, Wisconsin

- Albert Williams, Haleyville, Alabama

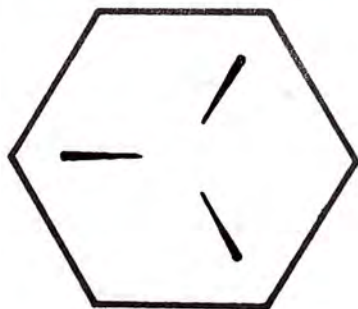
## **.22 RIMFIRE CASES FOR RIVETS**

Another use for fired .22 rimfire cases is for rivets. "Shorts" are about the right length for most jobs, but "Longs" or "Long Rifle" can be used, just shorten them to the length needed. I found they are easily spread by using a steel ball slightly larger than the diameter of the shell. Place it in the open case mouth and strike with a hammer.

- Orrin Parsons, Jr., Madison, Maine

## **FIRING PIN MATERIAL**

I've found that a hardened cap screw makes perfect material for round firing pins. Just cut the head off and chuck it up in the



lathe. The metal is tough, but not as hard as the name implies. When a cap screw has these three marks on its head, it's a hardened one. Use only these.

- Gary Thiry, Sacramento, California

## **FIRING PIN PROTRUSION**

The data listed below is what we have used in checking firing pin protrusion. Always use the **minimum** amount that will provide reliable ignition.

Center Fire Rifle	Min. .060"	Max. .065"
Rim Fire	Min. .035"	Max. .040"
Shotgun	Min. .060"	Max. .065"

- Bob B.



## FLAT FIRING PINS

The metal from circular saw blades makes perfect flat firing pins. (You've never seen a shattered circular saw blade!) A person experienced with a cut-off wheel can duplicate a flat pin with no problem. If the metal is too thick, take a wooden block that can be comfortably held in the hand and nail the firing pin to the wood with small finish nails along its edges. Snip the nails off flush with the surface of the pin. Now you can file or polish it on a felt wheel to the desired thickness without the fear of losing it against the wall or on the floor. If the felt wheel is used, just be sure not to get it too hot.

- Gary Thiry, Sacramento, California

## FIRING PIN STOCK

I go over to the state police salvage yard and buy the 7 ft. whip antennae that the "smokies" use on their cars. They are about 3/8" at the butt and taper to 1/16" at the top. After annealing you can cut the length you need and reharden to what I have found to be the very finest firing pins I ever made. They just never seem to break!

- Jerry Banfield, Glenarm, Illinois

## FIRING PIN REPAIRS

I never install a new firing pin if the tip of the old one is broken and I can drill a hole in the body of the pin. I select a piece of round spring steel of the proper diameter (from a package I purchased from you in 1950!!!) and drill a hole in the pin body, soft solder the spring wire in the hole and have a superior tip. I leave the entire length of the wire in the hole until soldered to carry away and distribute heat so as not to disturb the temper. I have never had a pin returned that had this new nose job!

- Francis A. Green, Cheyenne, Wyoming

## OVERHEARD AT COFFEE

1st girl: "My mother always gives me the most wonderful, sound, logical advice."

2nd girl: "What's wrong with that?"

1st girl: "Well, it always interferes with what I already have planned!"

- The Gang at Brownells

## MAKING NEW PART FROM BROKEN ONE - THE EASY WAY

One of my shooters broke the hammer on his Russian Free Pistol, and a local shop here made him a new one (it did not work,



but I spent 3-1/2 hours on it and now it's OK). The point is, though, that to use it as a model, they silver soldered the broken pieces together to get the dimensions rather than try to measure the two pieces and add them up. Could actually even use Acra-Weld. Really simple idea, but someone had to think of it first. Probably dates back to the Bronze Age?!

- *Lt. Col. F. B. Conway (Ret.), Las Cruces, New Mexico*

### **QUICK TRIGGER GUARD REPAIRS**

Just had a cheap pistol come in with a 1/2" chunk missing from the trigger guard. The owner did not want to spend much on a repair job, so I made a trough of masking tape and poured in Acraglas stiffened quite heavily with floc. After it had set up, I filed it to shape and painted the whole trigger guard with black lacquer. Cured the problem - and the customer was pleased... and that's what counts!

- *B. M. Cummins, Monroe, Louisiana*

### **THROW-AWAY SYRINGES FOR THE SHOP**

Use those plastic throw-away syringes with at least a one inch needle for getting glue into tight places, also works good for oiling hard-to-reach places on guns, fishing reels, etc. Filled with Neats Foot Oil it works good for getting it in on hard to reach places on leather goods.

- *Larry McDermott, Pescadero, California*

### **SHAKE THAT MOTO MICA**

Use Moto Mica in a pepper shaker with a little rice in it to keep it loose.

- *Hugh W. Woods, Jr., Chambersburg, Pennsylvania*

### **HACKSAWING AND MOTOR OIL**

I do a lot of hacksawing by hand and find that my blade life and arm life are increased by coating my blade with No. 40 motor oil!! I sometimes saw up to 60" of 3/16" bar stock at one time because my bandsaw is State Side... the oil let's me do it in half the time - and ease.

- *Melvin Dunn, APO, New York*

### **SUPER PENETRATING OIL**

Few people know it but the best penetrating oil you can use is real Oil of Wintergreen (NOT synthetic). When nothing else moves it, this will!

- *Dan Johnstone, Miami, Florida*



## **"O" RING DISINTEGRATION**

I work primarily on air and gas guns and recently ran into a real problem with some of the exotic penetrating oils. I like them for most guns, but they just eat up "O" rings and seals found on most air guns. I learned the hard way and ended up replacing some rings and seals that I normally would not have had to. I hope this warning will help prevent others from getting into the same problem.

*- Jim Davis, Folkston, Georgia*

## **EVERY YEAR...**

...my wife and I pack up and go down south for a good vacation. We go to get away from it all and forget everything. And, sure 'nuf, by the time we get there and unpack, my wife swears that I forgot everything.

*- Bob B.*

## **"RUSTING FOAM" IN GUN CASES**

The rigid foams are made using steam during the molding process. If these are not properly dried, they may contain up to 15% moisture and retain it for months. Obviously, it will cause metal to rust and wood finishes to fade. Soft foams are made with various blowing agents, all are good oil and grease solvents. (Toluene, pentane, methylene chloride, trichloro ethylene and similar materials.) Sometimes these agents, tho highly volatile, will remain trapped in the closed cells for long periods. As these escape, they can effectively degrease the metal and cause rust. There's not much the customer can do about it as it is defective quality control on the mfg's part. (From Bob B.: I mention all this so that should you have customers coming in complaining that their guns are rusting after using "such-and-such" brand of gun oil - or after you blued it for them, you will have at least one base to start working from.)

*- Baker's Gun Shop, Marshall, Texas*

## **WATCH THE GLUE**

I just had a guy come into the shop with a new S&W Mod 14 with rust pits all over. I asked him what he had had it in, and he said he had glued some extra rubber foam into his gun case with one of those white glues. I wonder if these glues are a dairy product and have some lactic acid in them that's doing the dirt? (Note, BB: - have had questions like this before as the result of people doing similar things in the past and getting rust. Should you do it,



let the glued item set open and out in the breeze for a couple or so days until all traces of fumes are T-Totally gone.)

*- Jack Gutheridge, Dyer, Indiana*

### **VIBRATE IT CLEAN**

I stopped down at the local discount store and picked up one of the Oster brand foot vibrators. It has a big plastic tub (big enough to put 2 large feet into!) and lots of vibrator action. For handguns - and it will hold several - I use a non-flammable solvent (open motor brushes make lots of sparks; extremely dangerous explosion potential with any flammable solvent!!) For really big batches of brass, just use lots of polishing media. Besides, you can always tune up those size 11's, too, after a tiring day on your feet polishing, bluing, or even trekking around the countryside hunting.

*- Eldon Morris, Marshalltown, Iowa*

### **CLEANING OFF DYKEM, ETC.**

I use my wife's fingernail polish remover, and it works real well. In fact, I keep a couple of bottles of the bright red fingernail polish around the bench for remarking the grooves in cross-bolt safeties after a blue job, marking tools, etc. Sometimes the customers do look at me a little strange when they see the bottles, tho.

*- William Bingham, Essex Junction, Vermont*

### **CLEANER FOR THE BENCH**

I've discovered that the "Automatic Choke Cleaner" in aerosol cans sold by Sears works very well for removing dried out lubes and stock finish from gun parts. It doesn't harm bluing, by the way. Use only on metal. 1) Wipe off accessible loose dirt. 2) Observing precautions on label of can, spray parts to be cleaned. 3) Scrub with small brush if necessary, although this is generally not the case. 4) Flush thoroughly with hot water, dry, oil. I used it on a Win. M-97 last night that seems to have been kept in the barn for stirring manure and never had one come out cleaner!

*- Trinko's Gun Service, Watertown, Wisconsin*

### **KEEPING PLASTIC SPRAY NOZZLES CLEAN**

It always seems like the second or third time with any kind of canned spray paint or finish, you find that those darn plastic nozzles clog up. Well, I found a simple solution for this. I store each can's nozzle off the can and submerged, after the first use, in a jar of paint thinner. It keeps them from clogging up, and a short



burst beforehand pushes out any thinner before applying the real stuff.

- Reg Lipp, Fairchild, Washington

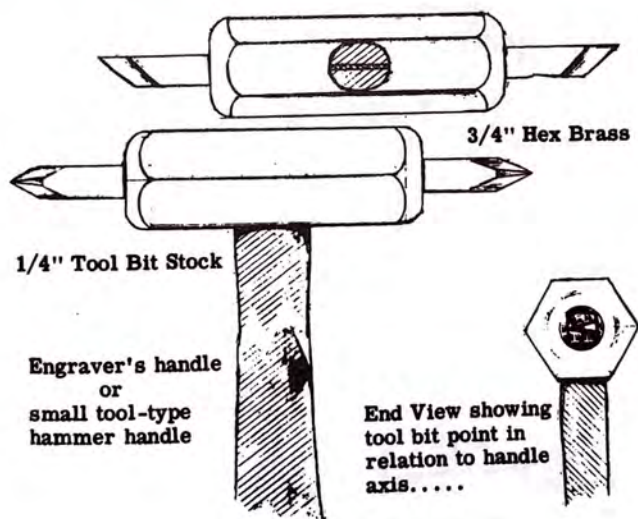
### CLOGGED SPRAY NOZZLE

I have had trouble with Tru-oil spray cans and the polyurethane spray cans with the nozzle clogging up after sitting for a while. Now I wrap a small piece of cellophane tape around the nozzle and forget about it. The nozzle is always clear the next time I go to use it.

- Ralph Boyce, Humeston, Iowa

### BEAUTIFUL STIPLING TOOL

The enclosed sketch is a tool I made up and have found useful for stippling or roughing up front straps on the .45 auto. For me it is a lot easier and faster than the hammer and separate prick-punch method. Don't even need a vise! The double end allows strokes to be in either direction, which is handy in close quarters, like near the trigger guard, and allows directional gripping. I find the gadget useful for other parts too, like sight ramps and tool handles.

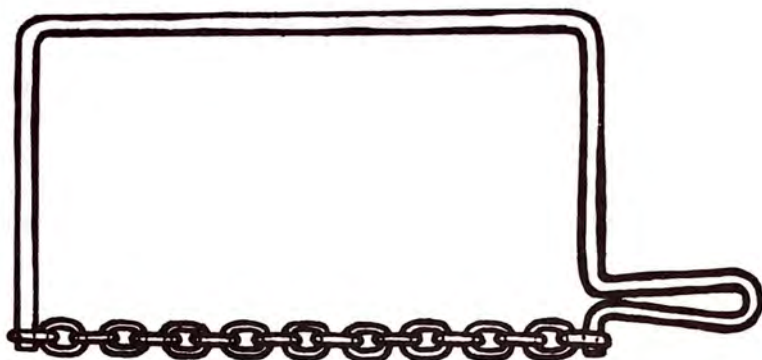


To set in the points, I drilled holes in each of the brass heads slightly larger than the size of the tool bit stock used and about 3/4" deep. Then ground the corners off the steel up about 5/8" from the base and made a couple of small notches on corners. I set mine in with an arbor press, tho it could be hammered. Grind point after fitting.

- F. J. Danforth, San Francisco, California



## CHAIN SAW



To be used when you aren't sure you are cutting in the right place - Not so fast & bigger hole!

- Merl Ray, Cleveland, Ohio

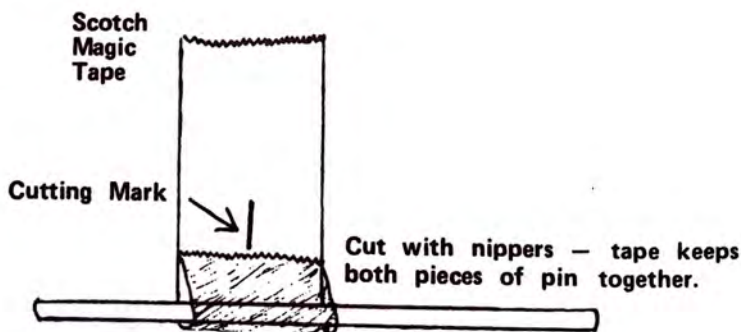
## POWER STIPPLING

The next time you have to stipple a hammer, sight ramp, or back strap, use a Dremel Electric Engraver. It really does a nice job, and you can work down to a fine line with it. The parts really look good after being blued.

- M/Sgt. W. C. Morrow, APO, New York

## CUTTING PINS WITHOUT LOSING THE PIECES

If you never had a freshly cut pin fly out of the nipper and hide itself in the usual shop clutter, you never nipped a pin off



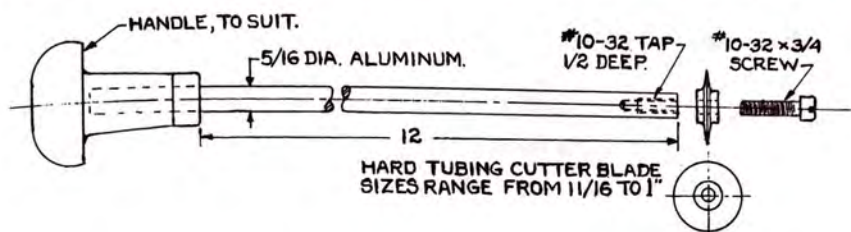
(whatever other kind of nipping you mighta done)! Man, if I had a quarter for every pin that I lost and never found . . . This Kink is so simple, and it's serendipitous - the tape gives a surface for marking off with a pen the spot where you want to nip through the music wire or drill rod.

- Ken Howell, Dugway, Utah



## METAL SCRAPER

A long reach scraper with interchangeable blades that are easily sharpened can be made as shown in the drawing. Made originally

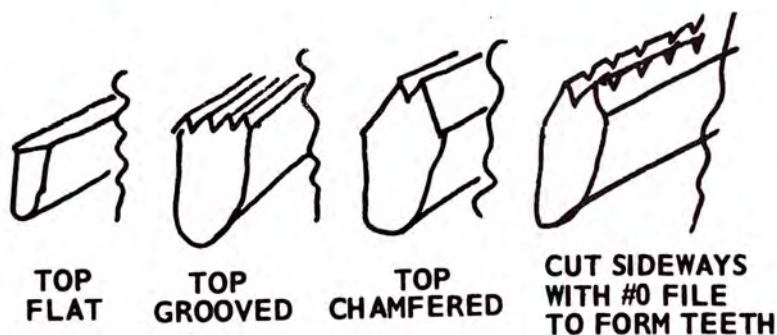


to deburr long cylindrical actions that had been drilled and tapped for scope mounts - it has many other uses too!

- Harry G. Vorkink, Vancouver, Washington

## 2-LINE METAL CHECKERING FILES

I gave up on finding 2-line metal checkering files, so I made up my own as follows: Took some heavy flat spring stock and ground



one edge flat. Then used a standard checkering file to cut guide lines the full length (about 6"). Pictures may say it faster.

- David Byron, Casselberry, Florida

## CLEANING METAL FILES

File cleaning is easily done with a piece of copper or brass. For Swiss files I use old cartridge cases for cleaners by squeezing the neck of a .30-'06 case flat in a vise. Lay the file down flat to cut teeth on the cartridge lip which will match the teeth of the file, then use the brass to scrape out the file teeth. Hold the rear of the case up at about a 30° angle and push the flattened tip parallel to the file teeth. Four or five strokes will shape the brass case tip if you hold steady and push with down pressure. This is not the random brush strokes of a file card, more like cleaning up checker-



ing with a tool having 10 or 15 cutters. The tool will clean about 3/8" of file per stroke, removing all crud, pins and chips. Each stroke parallel to the file teeth resharpsens the tool. Try getting a file as clean as possible with a file card, then use this system to find out how much you've missed.

(The above must be very good because it was sent in by three different gunsmiths. - Bob B.)

- Ernie Ballinger, Sebastopol, California
- Wesley Peterson, Esmont, Virginia
- Dan Plamondon, Crescent City, California

## COLOR CODING FILES

Files that have been used on metal never seem to cut wood properly again. I isolated my wood cutting files by painting the handles RED. Then, no matter what the temptation, I never use them on metal.

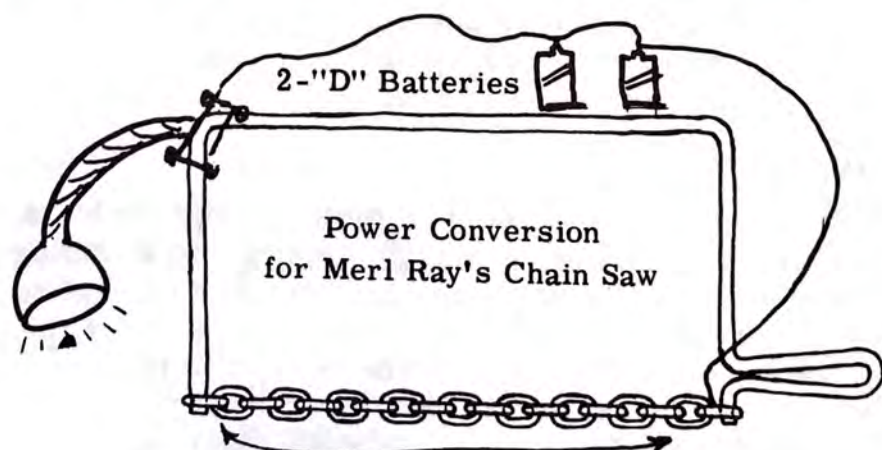
- Lt. Col. F. B. Conway (Ret.), Las Cruces, New Mexico

## CHALK THAT FILE

When drawfiling, it's especially helpful to chalk the file, which keeps it from gouging metal as you are working down the flats of the barrel. The talc crayons in your catalog are ideal for this. Real easy to do, keeps the teeth clean and free from loading up, and I think it makes carding easier and extends file life. Also works extremely well for just doing regular filing where it is important that the final finish be perfect.

- Bob Lame, Alta Loma, California

## POWER CONVERSION FOR MERL RAY CHAIN SAW



**\*\*REVISED INSTRUCTIONS\*\***  
Reverse chain for improved cutting action.



Dave is a true gunsmith - always looking for a faster and better way. *Bob B.*

*- Dave Carnathan, Burlingame, California*

## **TOOL HANDLES FROM CO<sub>2</sub> CYLINDERS**

Empty CO<sub>2</sub> cylinders from BB or pellet guns make excellent handles for small tools, picks, pistol cleaning rods, etc. Use your excess Acraglas after enlarging the hole in the cylinder to fit - you can also use silver solder if you want.

Best part is that they are free.

*- Pete Hoss, Ft. Lauderdale, Florida*

## **STAKING TOOL**

When your automatic center punch becomes worn, grind and shape like a small screwdriver and harden it. You can use this to stake in a real small place. You can hold your work in one hand and stake with the other. I wear an eye loupe when doing small parts.

*- Charlie Duxstad, Clinton, Wisconsin*

## **ARMOR-PIERCING CENTER PUNCHES - WARNING!!!**

In *Kinks I* there was a mention to use .30 caliber armor-piercing bullets as center punches. This works fine; however, be sure you never use any .50 caliber armor-piercing bullets. They were made during the Korean War with a small explosive charge in the tip which would go off as soon as you rapped the bullet smartly. So, be sure of your caliber.

*- Garland S. Hayden, Philadelphia, Pennsylvania*

## **IMPACT DRIVERS' MANY USES**

Couple years ago I got one plus an adapter for the screwdriver bits. It laid around for a while - only used on frozen screws or tight nuts on my car. Then I got to regularly using it to set up scope mount screws with Loctite. I grind separate bits to fit and now use it daily for darn near everything.

Last week a fellow brought in a Spanish shotgun with a broken firing pin. It takes a special spanner wrench to remove the firing pin bushing. Another gunsmith had, but charged plenty for the job of only removing. (No bitch as he had a helluva time and spent over an hour.) Anyway, I ground a broken punch body to fit the spanner holes and the shank to fit the adapter. I set it up to the index mark with the impact wrench with ease. As an experiment, I took out the other bushing of the double. NO problem and NO scars like were put on the first one in the tough removal job.



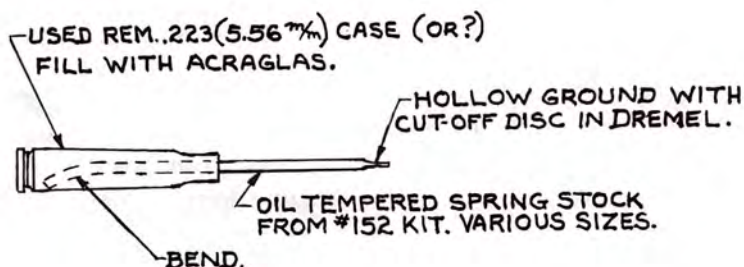
In the future I will grind a punch body or screwdriver up to fit the spanner holes and I'm all set. It is nice to have the right tools for the job!

- Bruce Jennings, Corpus Christi, Texas

- Lt. Col. James Bryant, Fairborn, Ohio

### SPECIAL FINE SCREWDRIVERS

For some really fine screwdrivers, I used your Number 152 spring kit and some fired 5.56 mm cases. I cut assorted sizes of spring stock about 3" long using a Dremel tool and cutoff disc,

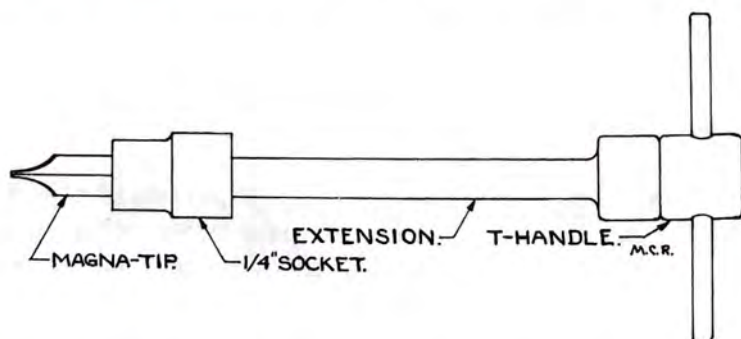


and then hollow grind one end to the desired blade thickness and width. I fire up the propane torch and heat the other end so that I can put a small bend in it. Then slip into the fired case and fill with Acraglas.

- Jim Davis, Folkston, Georgia

### MAGNA-TIP EXTENSION SCREWDRIVER

A quick screwdriver can be made up by the gunsmith who has a quarter inch drive socket set around. Use a 1/4 inch socket and a



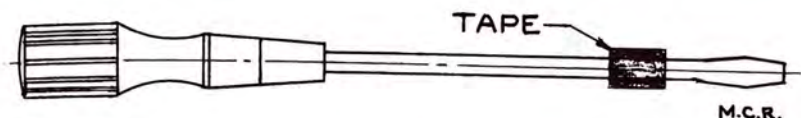
Magna-Tip bit, and a little tape, if necessary, to keep them together. This set-up is especially handy for those special thin-slotted stock screws in foreign guns.

- Wayne Wilson, Somerset, Kentucky



## STOCK BOLT SCREWDRIVER

When removing the slotted head type stock bolts, I've always had the fear of the screwdriver blade slipping out of slot and splitting the side of the stock, so I use masking tape as per the drawing. The tape can be added or peeled off depending on the hole size in the butt plate.

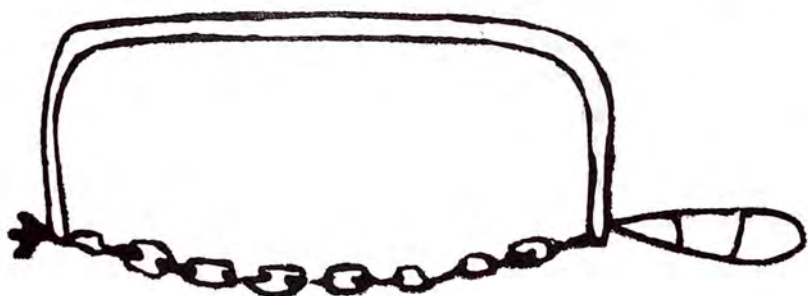


This method is easy, and it sure doesn't let the tip of the screwdriver jump off and spoil a stock.

- Jim Davis, Folkston, Georgia

## CHAIN SAW DESIGN FLAW

Speaking of design flaws - it seems that some of you are having problems with the chain saw. Jack Thompson writes that our



specs were wrong, for either the chain is too long or the frame too short. Of course, this isn't the problem. He just made the center of the chain too far from the frame top!!

- Jack Thompson, Birmingham, Alabama

## DEMAGNETIZING TOOLS

Nothing provokes me any more than to reach for a screwdriver, a punch or a scribe that's not supposed to be magnetized, while I'm holding a handful of parts that are under compression and have a chip hanging to the tool due to it being magnetized. The way I solve this problem is, turn on the hand-held instant soldering gun and pass the tool between the two poles that are fastened to the tip. Works every time - the tool is demagnetized!

- Gary Thiry, Sacramento, California



## GETTING THOSE SMALL SCREWS INTO PLACE

Keep a cake of beeswax on your bench, and when you have a small screw to put down into a small place, stick the blade of the screwdriver into the beeswax, put the screw onto the blade and the wax will hold the screw in place until you can get it started in the hole. Wish this were my own original kink, but I picked it up from a friend of mine who is without a doubt the most honest and efficient radio/tv repair man I have ever watched work.

- R. A. Sjöberg, Fountain Valley, California

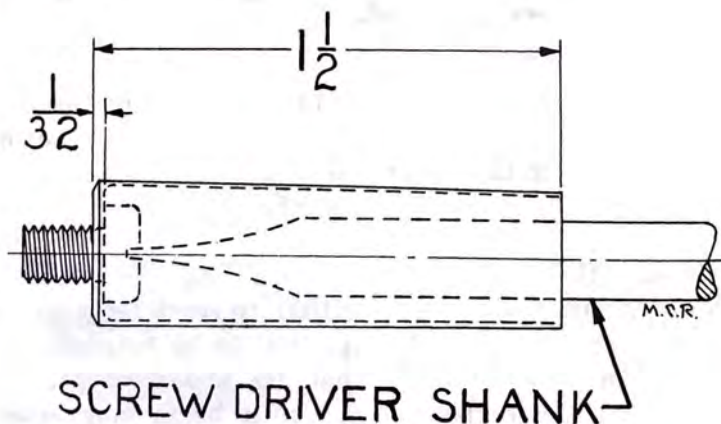
## FIGURING OUT THE INTERNAL THREAD SIZE THE EASY WAY

Had a time trying to figure out the thread of the missing tang screw of a P-14 Enfield. A friend of mine told me to take a piece of lead wire, screw into the hole, back it out and use the thread gauge to measure. Works great and so simple. (I couldn't find any lead wire around my shop when I wanted to try this out, so twisted strands of rosin core soft solder together to make a piece the right size and it worked beautifully! FB.)

- Earl White, Strykersville, New York

## SCREW SHORTENING CASE

Here is a goody that saves me ground-up or burnt fingers, and hunting around on the floor for those to-be-shortened screws. Take an empty .30-'06 case, chuck it in a lathe, and turn the rim off so the thickness of the head is about .030". Drill out the flash hole to fit the size screw you want to shorten, and shorten the case to approximately 1½".



Using a fine wheel on the bench grinder, drop the screw into the case so the threads are sticking out of the case, and as you

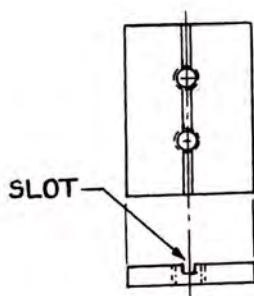
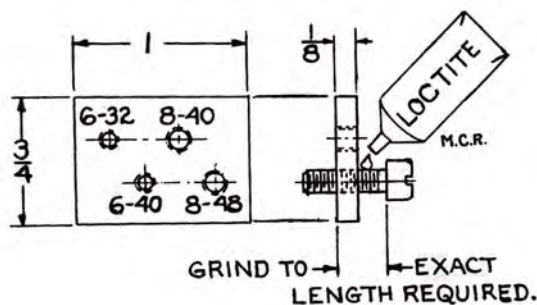


grind away, turn the screw with a screwdriver (be careful and you won't even have to clean up the threads).

- Kent Van Galder, Beloit, Wisconsin

## SCREW LENGTH CUT-OFF FIXTURE

In case some of the Brethren have problems grinding screws to specific lengths, here is the method I use. Just get a piece of 1/8" thick stock, that's probably lying around the shop, drill and tap to thread size needed, and harden. Add a drop of Loctite to the screw and set it up to the exact measurement required. Then clamp block in the good ol' vice grips and grind away. The screw won't move, and the job will be perfect.



By the way, if you find that you need to make a lot of slotted head set-screws, grind a slot dead center to the holes in the jig before hardening. Grind the slot to the width of your screw head file so you will have complete control over the width of the slot.

- D. Byron, Miami Beach, Florida

## SHORTENING SCREWS

To grind screws shorter, simply wrap copper single-strand wire of an appropriate size around the shanks and grip with pliers. This prevents marring the shank. To prevent marring the head as well, make sure wire is heavy enough or wrapped on thick enough to exceed the diameter of the head. . . .

- Les Gardner, Mt. Shasta, California

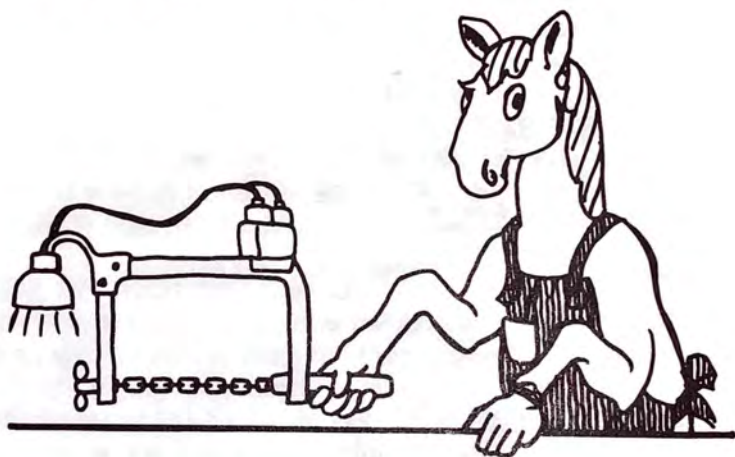


## UPHOLSTERY CLAMPS AROUND THE SHOP

One of the handiest things for certain projects is upholstery clamps which look like spring clothespins. They have excellent power and do not "creep" like most clamps will. They're especially handy when making pistol grips to hold the blank on the frame. I've had a couple for 10 or 12 years now and have found uses for them all over the shop. Just keep them next to the bench pinched on just about anything so they'll be handy when you need them.

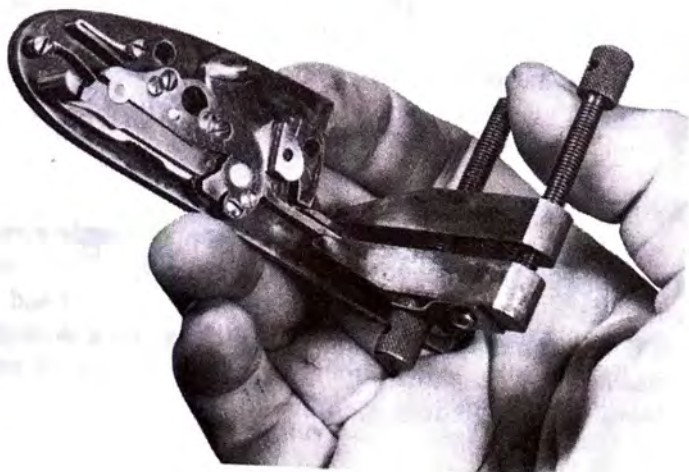
- Dick Miller, Joliet, Illinois

## SAW HORSE FOR CHAIN SAW



- Jack Thompson, Birmingham, Alabama (drawing by James B. Meek)

## CLAMPS FOR "V" SPRINGS





I thought you would be interested in knowing that your little machinist clamp #550 works beautifully for compressing "V" springs. Of course there probably isn't much call for spring vises, but those of us who work on European double guns and old L.C. Smith guns need such a gadget.

- Edward Hutchins, Powell, Ohio

### SMALL HAND CHUCK

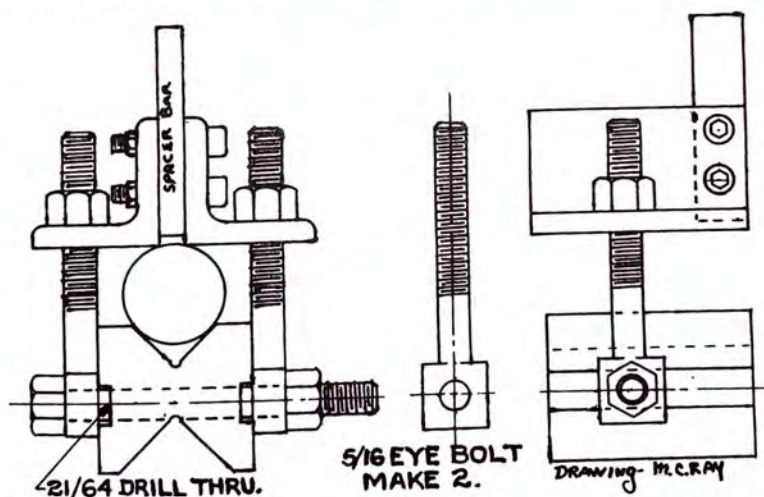
To make my own small hand chuck I removed a chuck from an old broken electric hand drill and mounted it on a large file handle. I used a piece of threaded drill rod to attach the chuck to the handle, and then cross-pinned the rod to the handle to keep it from turning. Really works well.

- R. D. Harris, Mansfield, Ohio

- Ted Manzer, Atkinson, Nebraska

### STEEL STAMP MODIFICATION FOR B-SQUARE

This is the way I modified my B-Square stamp guide for round and octagon barrels. I used a "V" block, and drilled through the side grooves for a 5/16" bolt. Then made a couple of 5/16" eye bolts for



clamps. Two smaller cross bolts are used to hold spacer in position. This setup eliminates slippage and makes it easier to come up with a professional job. This is especially nice when you have spent a lot of a customer's money building him a super-deluxe gun, and you want the scoop on the barrel to look like the rest of the job.

- Campbell's Bullshooter Shop, Mesa, Colorado

### STRAIGHT-LINE STAMPING

When trying to get a uniform straight line for stamped names or numbers on a barrel or actions or tools, I have been using

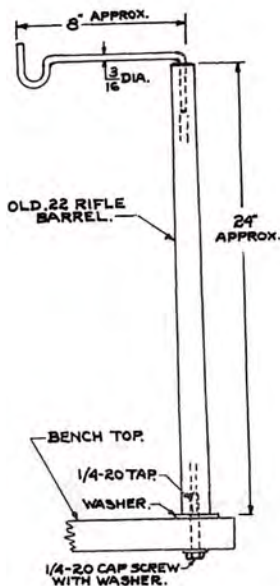


"Dymo" plastic labelling tape. The stuff is stiff enough to form a stop for each letter or number. Where it really comes into its own is when you want a line that isn't straight. Trim the tape with a sharp knife to form a semi-circular or uniform wavy line stamping guide and really do some classy work.

- Wally Philippiw, Prince Rupert, British Columbia, Canada

## FOREDOM CC MOTOR BENCH TOP STAND

An old .22 cal. rifle barrel can easily be converted into a holder for your Foredom CC motor unit. As shown in the drawing, I at-



tached the barrel to the top of my work bench out of the way but close enough for the flexible shaft and Foredom handpiece to reach my vise.

- Jack Thompson, Birmingham, Alabama

## SPEED CONTROLS - THE EASY WAY

After getting my Dremel Moto Tool from you, and forgetting to get the Speed Control also, I ran into a problem because of its high speed. As one of my customers wanted his guns blued right away, I happened to think of the Rears and Sawbuck sewing machine my wife has which happens to have a foot operated speed control on it. Needless to say, it ain't there no-mo! The whole works just unplugs from the sewing machine and will operate anything up to 1.2 amps draw. Use the plug slots numbered 2 & 3 for the tool being used. Slot #1 is for the sewing machine light. The control really worked great until my wife found out that she



couldn't run the sewing machine without it. So - I said that she could use it if she would make me a gun case out of shot bags!

- *Dennis Thode, Cedar Rapids, Iowa*

- *Eldon Morris, Marshalltown, Iowa*

## HAND GRINDER SPEEDS

Don't think enough can be said about slowing down the (17000 to 45000 RPM) various hand grinders when using rotary files. Most are burned up and not worn but. But, some of the heavy cutters are extremely dangerous at these high speeds and will break loose from the shank. I saw one go the length of the shop (some 70-80 feet) at Ft. Benning and put a dent in a metal panel. Finally got the boys to slow it down but you can't say it often enough.

- *Lt. Col. F. B. Conway (Ret.), Las Cruces, New Mexico*

## CRIME DOESN'T PAY

This has to be one of the weirdest stories of the year. A woman accidentally ran over a cat, killing it. She went door to door in the neighborhood and finally found the owner who gave her a bag in which to bury it. The woman wrapped the bag in a piece of paper and put it in the back seat of her car then, pretty well shaken up, stopped at a restaurant for a cup of coffee. She happened to look out and saw another woman steal the bag and enter the restaurant, sit down and put the wrapped loot by her side. She carefully opened it to see what she'd got, saw the dead cat and fainted dead away. An ambulance was called, the woman put on a stretcher and the bagged cat on top of her as the attendants didn't know what was in it.

- *Gary Thiry, Sacramento, California*

## BEEFING-UP CUT-OFF WHEELS

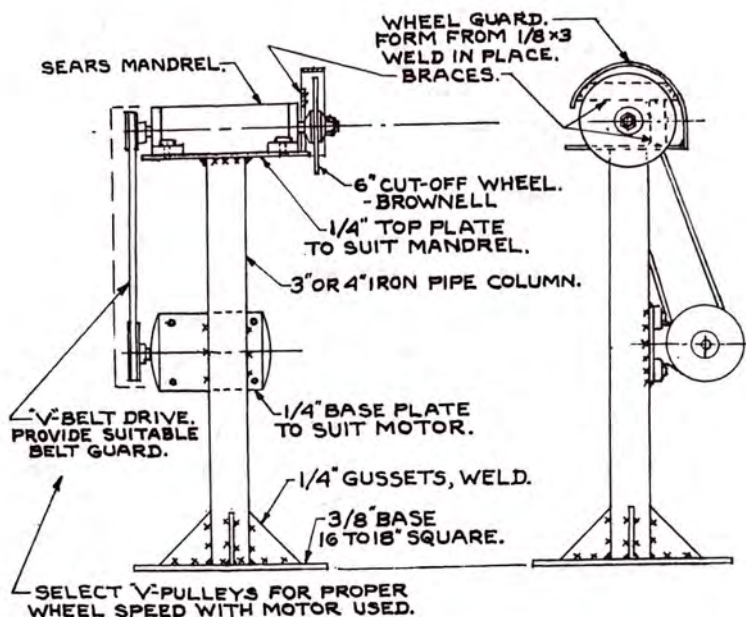
If you have an especially tough piece to cut with your Dremel tool and cut-off wheel, try using up to 4 wheels if the width of the cut doesn't matter. They seem to strengthen each other, and sure is better than just a single one.

- *Carl Westerberg, Ray, Minnesota*

## HOME-GROWN CUT-OFF MACHINE

The only piece I had to buy so I could build my cut-off machine was the mandrel itself; I bought it from Sears, and the rest of the metal and motor I had lying around the shop. The enclosed drawing is pretty much self-explanatory, and the only variation might be the placement of the motor. It will depend on the speed and size of the motor. (I also try to keep all my "V"



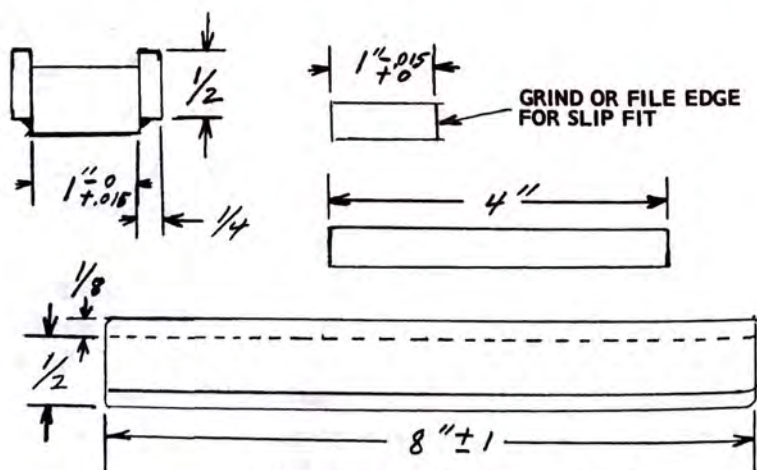


belts the same size to keep spare parts inventory down. Really helps.)

-Jack Thompson, Birmingham, Alabama

## HOMEMADE BELT SANDER BELTS

I've been making my own band sander belts for years. It suddenly came to me (light bulbs and all that) that maybe everyone hasn't thought of it. Since you sell both belts and rolls, you might think it worth passing on. I took a piece of 1/2" x 1" x 8" cold rolled and tack welded a couple of strips of 1/4" x 1/2" x 8" on the sides so they stick up about 1/4". I use a piece of 1/4" x 1" x 4" for a pressure pad and a welding clamp to apply the pressure ("C" clamp will do).



HAS TO BE LONG ENOUGH TO ASSURE THAT BELT WILL BE STRAIGHT

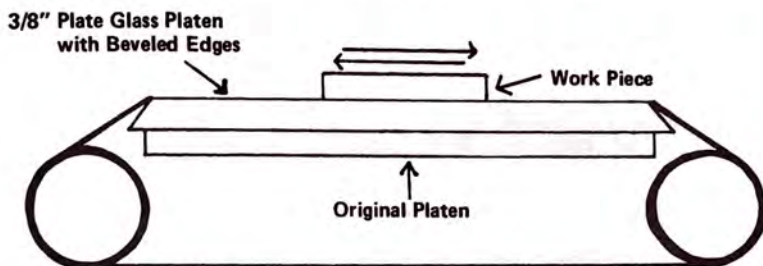


The drawing will explain it better than I can. Measurements aren't fussy except for the width. I cut the ends of the belt on about a 30 degree angle and glue with Elmers (use very little).

- George Murchison, Kewanee, Illinois

## REFINISHING FLAT SURFACES ON A GLASS PLATE

I made this up to cut time spent refinishing flatsided receivers and any other flat objects. Have your glass store grind bevels on 3/8" plate glass of the length to fit your belt grinder. When I had

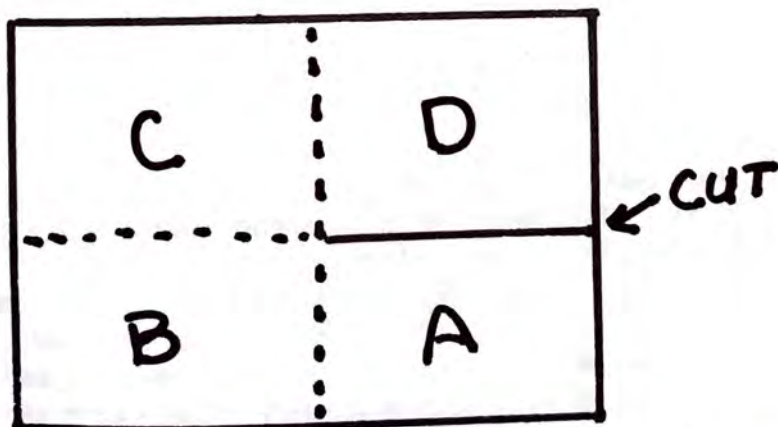


mine ground, he was of the opinion heat build-up would crack the glass, but ain't so. Who knows more about this stuff than a gunsmith? I held the glass in place with double face carpet tape. On my set up I must move the work back and forth to avoid a ripple in the finish from the belt splice.

- Gerald Downs, Louisville, Ohio

## "SCOTCHMAN'S FOLD" SAVES SANDPAPER

Here is an idea on use of sandpaper; fold on dotted lines, then cut 1/2 to center on folded line. Fold A back against B. Fold A & B



against (under) C and then D against B (under C). You now have 4 sheets of 1/4 sheet sandpaper for a pad and the abrasive sides don't touch, thus less waste.

- Tony Hunolt, Griswold, Iowa



## REDRESSING OILSTONES

When oilstones or Arkansas stones become hollowed and uneven, I redress them to a smooth flat surface with 60 grit carborundum flour (available at most any rock shop). On a flat steel plate I mix grit with a little oil and with some extra elbow grease can get a nice finish.

- Lawrence Turley, Mesa, Arizona

## RESURFACING A WORN OIL STONE

When my oil stones lose their shape through many years of use, I flatten them by grinding them back to shape on a flat piece of marble using an abrasive of about 1mm granules with water as a lubricant. Clean pit sand will also do the job nicely.

- Frank Zangel, Bulawayo, Zimbabwe

## ONE NIGHT ON THE TRAIN

The young man had sat for hours just staring out the window of the train as it sped through the night. Finally, he turned to the distinguished older gentleman who sat beside him and confided: "I just got out of prison today. It's going to be awful facing my family and friends again when I get home."

"I know," said the older man, "I'm just getting out of Congress myself!"

- Fred Moulton, Washington, D.C.

## RESURFACING GRINDING WHEELS

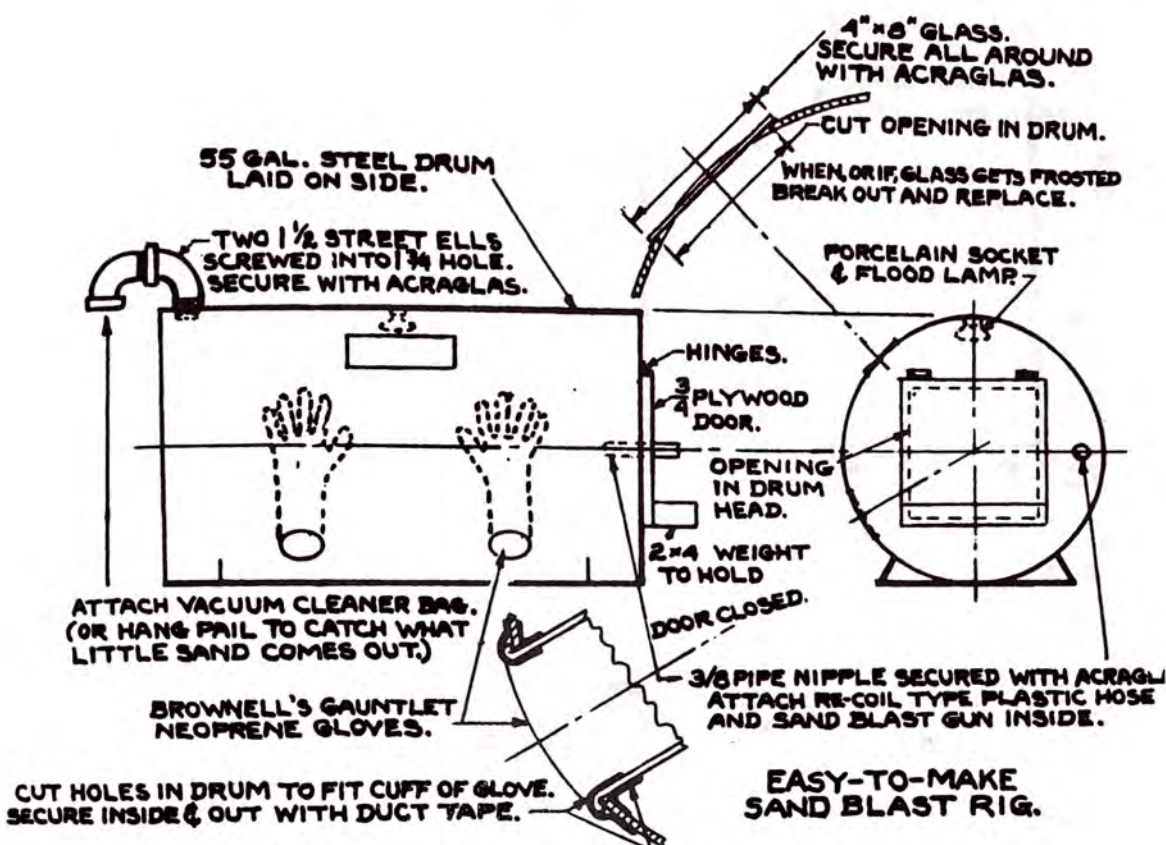
A real fine, long lasting and smooth item for refacing grinding wheels is the ceramic on old spark plugs. Simply start grinding the plug on your grinding wheel, and when you reach the ceramic it will rapidly and smoothly reface the wheel. One plug will last for many moons.

- Francis Green, Cheyenne, Wyoming

## SAND BLAST RIG

For someone who doesn't want to spend a mint right off for a sand blast rig or who has limited tools at the moment, the 55 gal. drum works good. 1 - Use a 55 gal. drum with removable top with band to lock lid also. 2 - Cut square hole in top to make wooden door and attach hinges. 3 - Cut 4"x8" rectangle out for glass. 4 - Do a lot of your securing with duct tape or Acraglas (see drawing for details). 5 - Use 50/25 sand at about 70 psi. (Note from Bob B. - I would suggest a small cross-bolt lock device to hold the door securely closed. Piled up sand could pop it open at the wrong time! The vacuum cleaner can or cannot be used. If not, the unit should





be vented to out-of-doors as that silica dust is pure hell on the lungs. See Catalog for gloves, sand blast outfit and Acraglas).

- Jack Thompson, Birmingham, Alabama

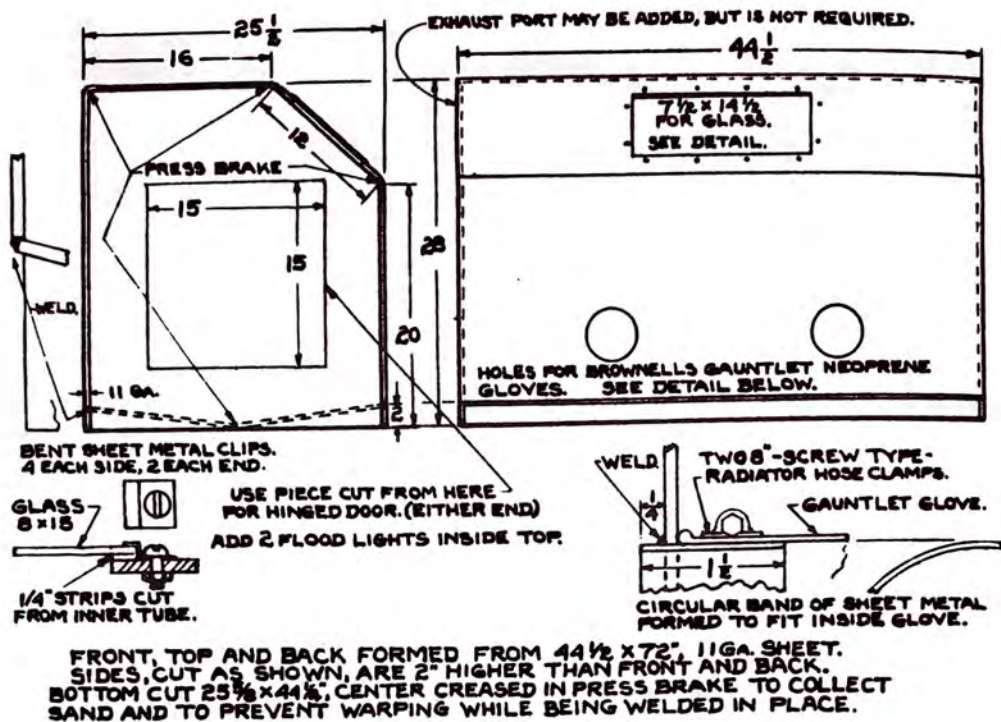
## BUILD YOUR OWN COMMERCIAL-TYPE SAND BLAST TANK

A commercial-type sand blast tank can be easily made if you can obtain some 11 ga. steel, the use of a sheet metal brake and either a gas or electric welder. The drawing pretty much covers everything, but one note of caution: wait until the tank is fully assembled before you cut the holes for the gloves and glass.

For internal air, I ran a 3/8 inch pipe in the back of the tank at the top of the right hand corner. Bring it across the top of the side to the front corner where I attached Brownell's recoil type hose and sand blast gun. I also added two flood-type lights in the top of the tank so that I had good light inside. Just be sure if you add lights, that the holes are cut carefully so you will get a close fit.

If you want you can also put in a vacuum connection to pull out the excess dust, but you will need to put a deflector on the inside of the tank over the hole so sand will not go directly into the vacuum.



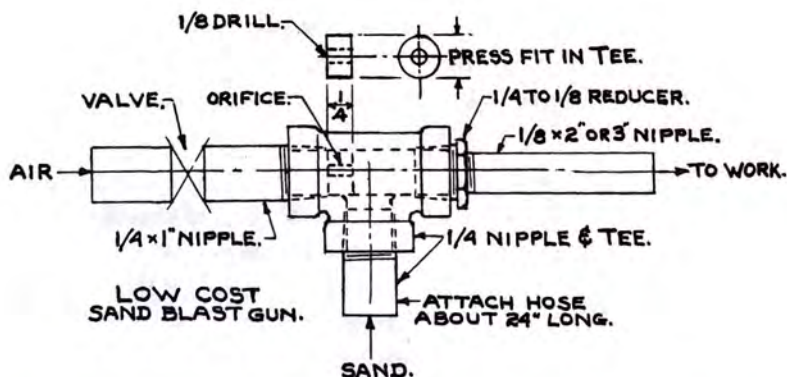


That's about it, and for a lot less than you can buy a commercial unit.

- Jack Thompson, Birmingham, Alabama

## PIPE FITTING SAND BLAST GUN - MODEL 1

For those of you who have not had a chance to buy or examine a sand blast gun, here is one way you can make one for just a few



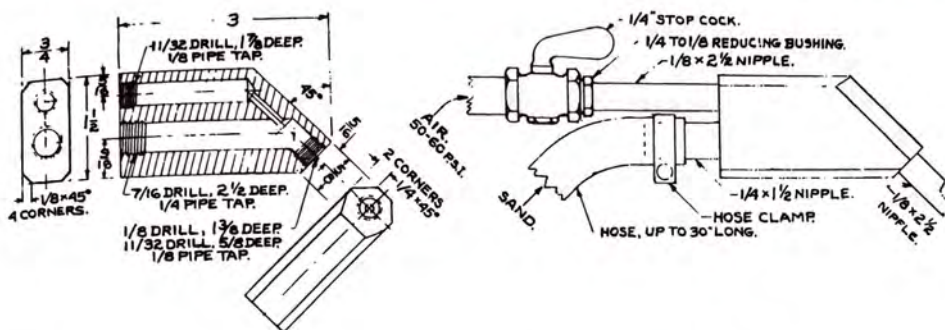
dollars. All the parts are standard pipe fittings except for the orifice, which can easily be made on a lathe. The drawing shows what else you'll need. Simple to do and slick to use.

- Jack Thompson, Birmingham, Alabama



## SHOP MADE SAND BLAST GUN - MODEL 2

If you have the availability of a few machine shop tools, you can make your own sand blast gun very inexpensively. I have add-

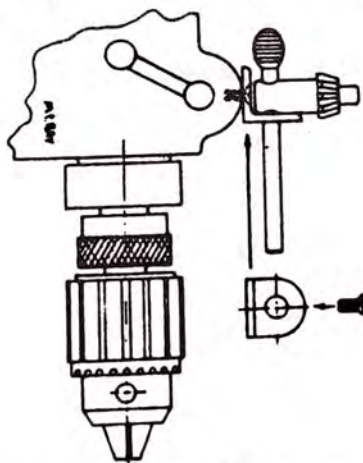


ed a water hose to pick up the sand, max. length is 30 inches, and you can use either a water or gas type valve for the air.

-Jack Thompson, Birmingham, Alabama

## DRILL PRESS CHUCK KEY

On the drill press, some have a hole back near the rear of the table mount to hold the chuck key. Mine didn't, and I made up a holder from a small angle aluminum piece and mounted it to the



belt cover (or just under it if necessary). Just position it so that it is in a handy position yet not in your way. After a few days, you automatically reach for it there, and even more surprisingly PUT IT BACK, so you don't have to go looking for it.

-Lt. Col. F. B. Conway (Ret.), Las Cruces, New Mexico

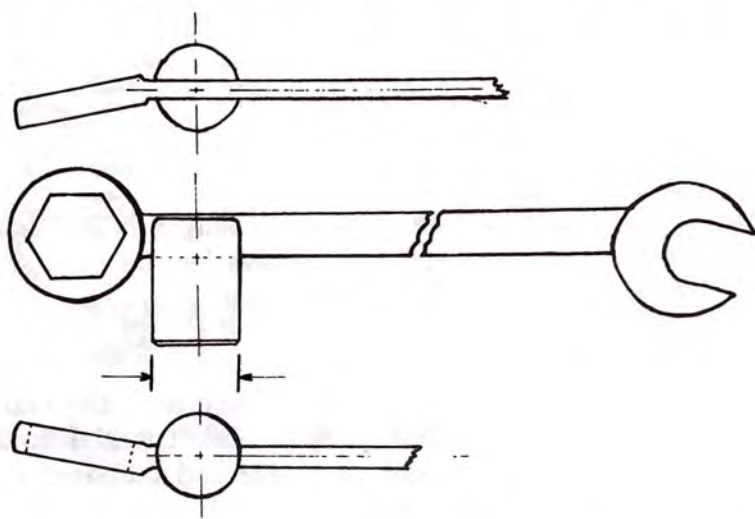
## COMBO MILL WRENCH/HAMMER

The sketch shows my tool for use on the ram-type milling machines such as Bridgeport, Millrite, Rockwell, etc. These mills



have a drawbar-collet-closer which required a sharp rap on top to release the collet. The usual procedure is to strike the drawbar with a wrench, damaging the drawbar, wrench, and maybe even the housing of the machine. Or, after loosening the drawbar with the wrench, you have to put it down and pick up a brass or lead hammer and strike the drawbar.

The tool in the sketch combines both the wrench and the brass hammer in one. I have used this tool for several years and saved

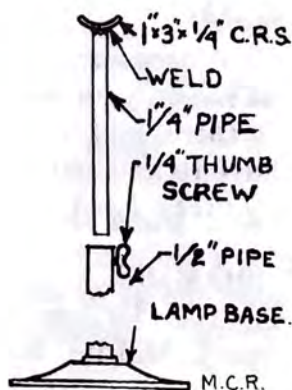


many steps and frustration caused because either the wrench or hammer had "walked away" for some other job.

- William Forsyth, Groveland, Massachusetts

## WISE EXTENSION

To keep the tail end of a gun supported in mid-air while being held in a vise, I sawed off the upper portion of an old lamp stand stem which was a  $\frac{1}{2}$ " pipe. Then I welded a  $1'' \times 3''$  strap for a saddle on the end of a 18" pipe or rod that could slip down into the cut-off stem. A  $\frac{1}{4}$ " thumb screw was fitted to the stem to





hold the rod at the proper height. A finishing touch is to cover the 1" x 3" strap to protect stocks and finished metal parts.

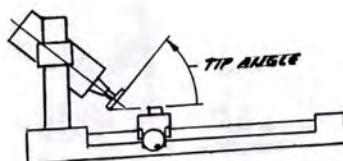
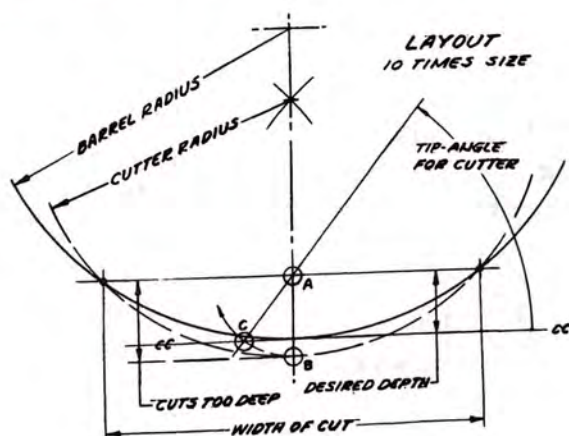
- Larry Hauser, Eugene, Oregon

## INTERNAL RADIUS GRINDING

Did you know that a small cutter - say 1/2" in diameter - can be used to cut short sections of large circles from 1/2" to maybe 8" diameter? All you need to do is tip the cutter to the correct angle and it will cut an ellipse. . . one short segment of the ellipse can be made to fit the desired diameter so perfectly that the error is impossible to detect.

This makes it possible to match machine any accessory, sights, bases, lugs, bolsters, bands, ad nauseum, to any point on any barrel or action, and you can use any diameter cutter whose diameter is smaller than the barrel but larger than the width of cut to be made. Wunderbar!

The math on this is enough to curl your hair all over! So! for the trade I got busy and worked out a quick graphical solution based on a ten-times size layout. A compass, steel scale, and protractor will solve the correct tip-angle to set the cutter to for a perfect fit in about 5 minutes.



The sketch shows the layout completed & may look confusing, but it is drawn in three steps which are easy to do.



**STEP ONE:** Draw in the barrel radius 10-times size and mark off the desired depth of cut for the accessory 10-times size. Look at the corresponding width of cut (it is 10-times size, too) and check that it is suitable for the accessory. Pick a cutting tool diameter that is in-between the barrel and the cut width, or trim down a grinding wheel.

**STEP TWO:** Set a compass to 10-times the size of the cutter radius and swing a short arc across the center line from each point where the barrel outline crosses the width of cut line. Put the compass at that located point, and swing an arc thru the barrel outline. If the cutter were used this way (not tipped) it would cut the right width, but the cut would be too deep.

**STEP THREE:** Since the width of cut line is correct for both the barrel and cutter, we don't want to change it, so we will use the point marked "A" in the drawing as a pivot for tipping the cutter from the "too deep" position up to the "Desired Depth" position.

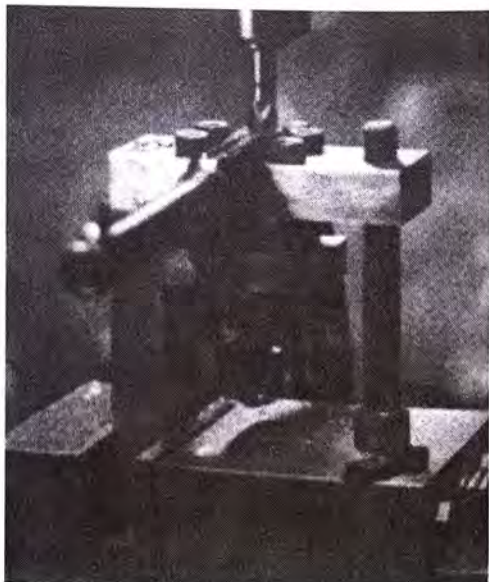
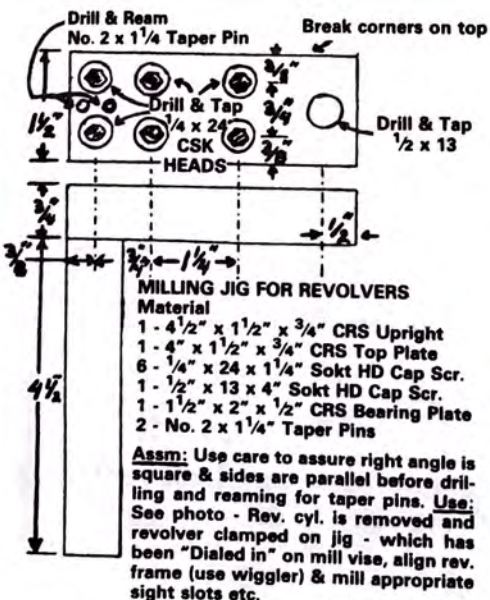
Set the compass on the point "A" and adjust to the point "B". Swing an arc up until it crosses the line "CC" and mark that point "C". Extend a line thru "A" and "C". Measure the required angle to tip the cutter with a protractor.

Set your cutter to the required angle and hack away. A typical set-up is also sketched.

- Dan Plamondon, Crescent City, California

## REVOLVER MILLING JIG

The drawing of the milling jig has accompanying photo showing its use. Most of the good revolvers will fit on the jig. In use,



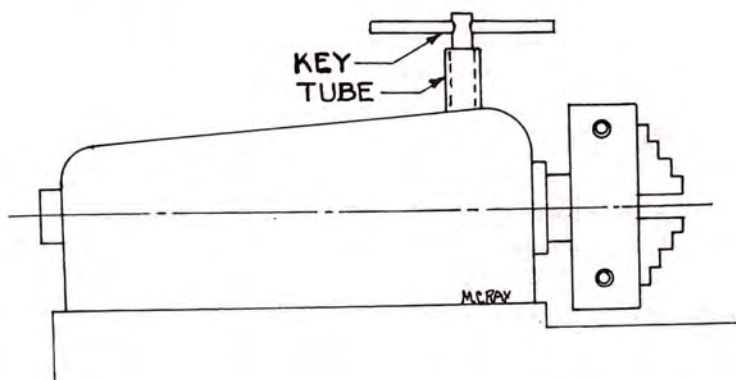


the jig is clamped in the milling vise, the revolver is then loosely clamped on the jig, and a wiggler is used to line up the revolver. The clamp is tightened and the milling completed.

- Paul Smeltzer, Fresno, California

## LATHE CHUCK KEY HOLDER

G. R. Douglas, of Douglas Barrels, showed me this one. He had made a study on how much time his men had spent looking for



their lathe chuck keys and came up with this idea. He mounted a piece of metal tubing on top of each lathe or on the nearest thing to it. The I.D. of the tube was just big enough so that the chuck key went right into the tube, and stayed there.

- Lt. Col. F. B. Conway (Ret.), Las Cruces, New Mexico

## CUTTING ODD THREADS ON A LATHE

This was learned a long time ago for making odd-sized threads, including metrics on a standard lathe with a quick change gearbox. For instance, the thread on the hammer stud of S&W Russian Model revolver is equipped with 38 tpi on the small end and 34 tpi on the large end. Neither of these threads are listed on the gear box. What you do is this: divide the tpi into 1.000. In this case 38 divided into 1.000 comes out to .0263 which is exactly what is listed under 13 tpi. (This is the advance per revolution of the spindle when using the feed screw.) When 34 is divided into 1.000 it comes out to .0294 under which 11-1/2 tpi is .0296, close enough.

Next, do not use the threading lever, but the carriage feed clutch. Do not release the clutch until final pass is made or you will have to set the tool bit up all over again. The lathe must have either a reversing switch or the clutch will have to be reversed by hand. It sounds complicated, but isn't. When you get to the end of the cut, back off on the cross feed and cut the switch off. Reverse



the motor and start over again, feeding in a little on the cross feed and repeating until the full thread is cut. I have made many screws, including those for the Browning Auto shotgun, by using this method with very good results.

- Harold Freeman, Meridian, Mississippi

## CUT-OFF TOOL

For an excellent cut-off tool, take a power hacksaw blade and grind off the teeth. Then, grind the end to shape. Really works great on any type of normal steel.

- Ben Newman, Agency, Iowa

## SNOW BRUSH YOUR LATHE CLEAN

Anyone needing a long skinny brush to clean up a lathe or milling machine should look into getting a windshield snow brush... it's just the ticket! They's mighty skinny and long and do a great job on chips. Besides, the cost is cheap and it even works well on swiping off the bench or whatever.

(Many of you Southern Boys aren't going to know about snow brushes... maybe you've got friends or family up North that would be happy to send you one.)

- Richard Hoch, Montrose, Colorado

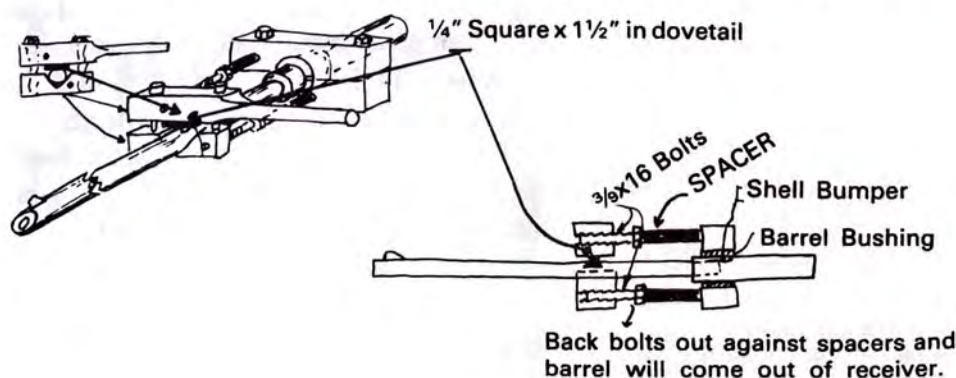
## FUNNY THING HAPPENED ON TV THE OTHER NIGHT

Guy said there was a "Fire at the Hart Farm" but he got a couple of lead letters transposed. Me, I thought I'd die. My wife didn't think it was funny. Can't win.

- Bob B.

## REMOVING PRESSED-IN BARRELS

I use this setup for removing pressed in .22 cal. barrels from receiver to replace shell bumper spring in Stevens Mod. 34 - Savage Model 65. To press barrel back in, tell wife you just got a new

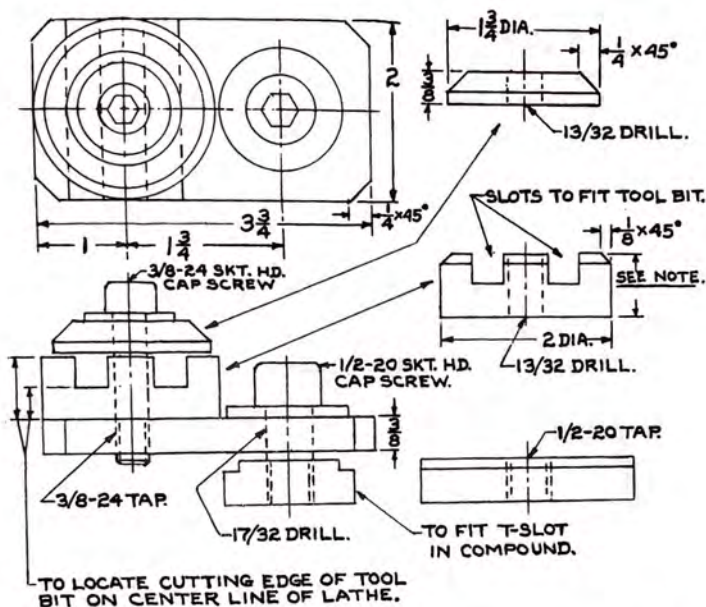




gun - when she starts to take off for ceiling, put barrel on top of her head . . . otherwise, a good furniture maker's "C" Clamp!!  
- Jack Gutridge, Dyer, Indiana

## "UNIVERSAL" LATHE TOOL HOLDER

Here is a drawing of a tool holder that I made for my lathe. It will hold 2 tools, fit any size lathe, and is very versatile. The holder



is adjustable in and out, plus on a radius. Also, it can be used on the end of a bar and is always on center - tool point to center of work - or can be cut short, and shims or washers can be used to raise or lower tool point.

-Jack Thompson, Birmingham, Alabama

## SWEETEN UP THE BARREL VISE

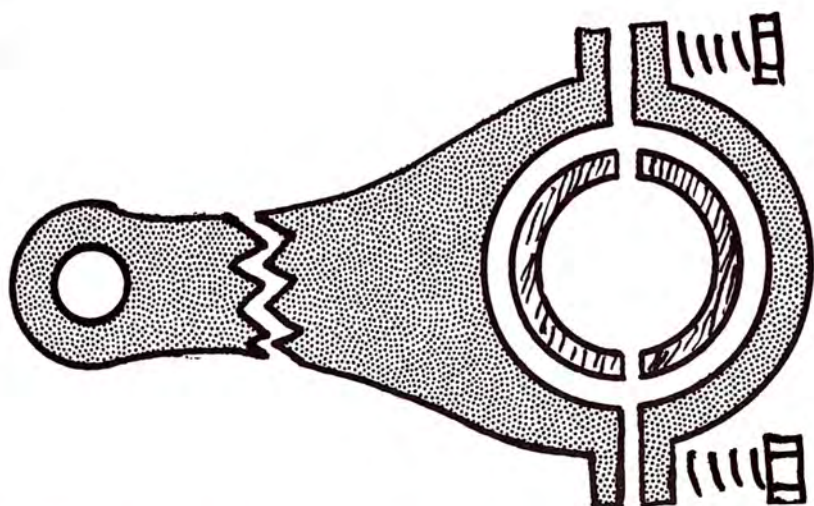
**SWEETEN UP THE BARREL VISE**  
Have you ever used plain sugar in a barrel vise bushing? Works real good, improves the grip and does not harm a fine blue job. Just put a small amount on the bottom bushing and a little bit on the top side of your barrel before putting the top bushing in place and tightening up. Sure does save time and fuss.

- A. Darrell Miller, Jr., Warm Springs, Oregon

**BARREL-VISE, CONNECTING ROD TYPE!**

**BARREL-VISE, CONNECTING ROD TYPE!**  
Now here's one for the book for the guy who needs a good, cheap barrel vise quick. An old connecting rod out of a Chevrolet truck, with the inserts removed, makes a dandy. Put shims be-





tween cap & rod, wrap barrel with tape or paper, pour in babbit. When cool, remove barrel bushing, split with a band or hack saw. Small strip of emery cloth may be used as gripping shims if you don't have to worry about bluing. Be sure and use hardened bolts - from any auto supply house.

- Kukelkorn's Gun Shop, Orangeburg, South Carolina

## BARREL VISE

For a long time now, I have been using a barrel vise of my own adaptation, which has been adequate for even the military-type barrel removing jobs. It is simply a heavy duty pipe vise mounted on a heavy pedestal with tractor wheel weight base. It is even por-

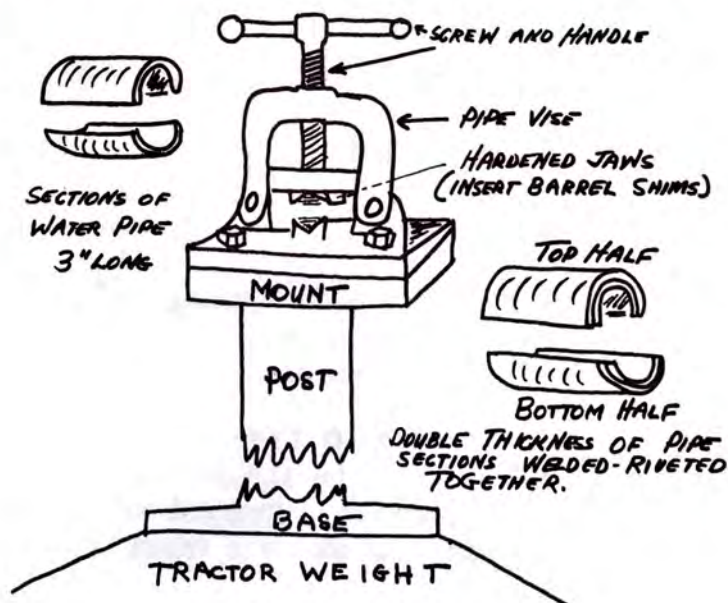




table in a limited sense. You can push it around on the floor if you are in good shape! (Darrel must be part bull moose - those weights are durned heavy!! - Bob B.) Barrel shims are made from water pipe of various sizes, cut to about 3" length, and then split. I found that it was necessary to weld or rivet two thicknesses together to obtain needed strength. Each half of the shim is then lined with lead, powdered with rosin, the barrel placed in the vise, the single large screw tightened up pretty tight, and go. It will even hold while you are battering the handle of your action wrench with a hammer. I did find it necessary to install screws to hold the hardened jaws of the vise in place, but this may not be true of all makes.

- Darrel Harrison, Cutbank, Montana

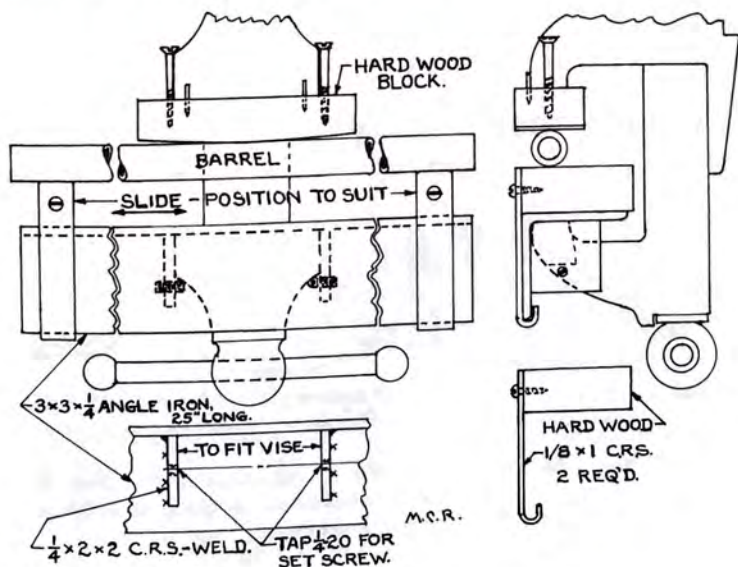
## USE AN AUTO BEARING PRESS

We've had trouble with various barrel vises and thought that others might find this kink of interest. It seems on some barrels the usual methods just don't hold, and the barrel will slip in the bushing. Our problem has been eliminated with the purchase of an automotive bearing press. Ours will exert 12 tons of pressure, and there are others that will put out 15, 18, 24, and even more pressure.

We also use this tool for removing stock pins, and to install some barrel liners. It's been a real time saver for us.

- Les Gibbons, Charlottesville, Virginia

## LOW-COST BARREL STRAIGHTENER





Here is an inexpensive barrel straightener that I made. I have straightened Browning vent rib barrels, among many others, all with very good success. It will take a little time, especially on badly bent barrels, but they all can be straightened.

- Carl Westerberg, Ray, Minnesota

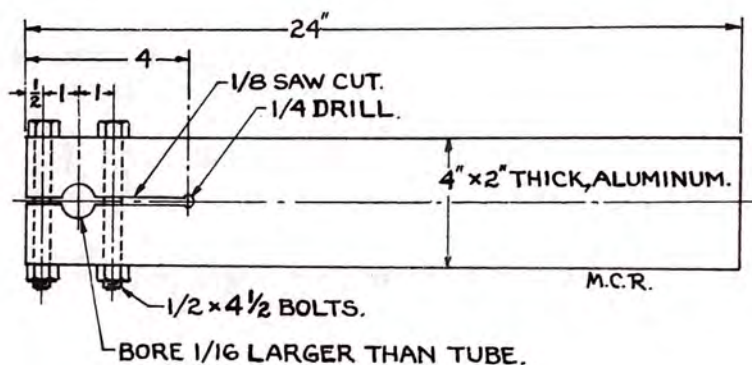
## I WONDER WHY?

Those who think they know it all are such an annoyance to those of us who do!

- Fred Moulton, Washington, D.C.

## SHOTGUN MAGAZINE WRENCH

You can make a real good shotgun magazine wrench from a 24" length of 2" x 4" aluminum if you follow the drawing. Just be

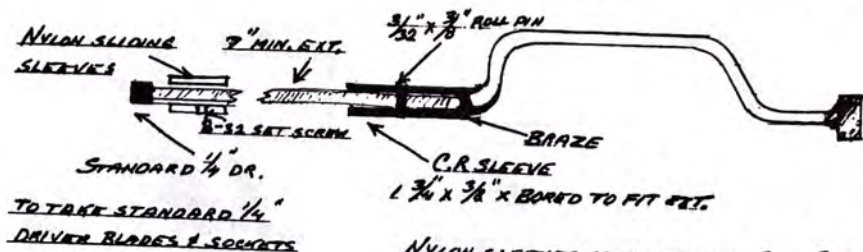


sure to make the hole  $\frac{1}{16}$ " larger than the diameter of the magazine tube so that you can put one wrap of sandpaper around the tube before tightening down the bolts.

- Arthur Thompson, Chase City, Virginia

## SELF-ALIGNING STOCK BOLT WRENCH

Rework a  $\frac{1}{4}$ " drive speed drive wrench as shown in the drawing below. The dimensions on the wrench may have to be altered



NYLON SLEEVES MADE TO FIT, SAV, REM, WIN, AND ALL OTHER STOCKS. 6 SLEEVES WILL TAKE MOST GUNS MADE.



slightly depending on the brand purchased. It can be used on any type of stock bolt by changing bit, socket, and nylon sleeve.

- *Harry Vorkink, Vancouver, Washington*

## **FREEZE OUT STUCK CASES**

I had an S&W .41 Mag come in with a broken cartridge case in the cylinder, busted just forward of the rim leaving nothing but the thin shell in the cylinder. To avoid scratching the cylinder, I removed it from the revolver and put it in the freezer for a couple of hours. Then just popped out the shell with a close-fitting wood dowel. After letting the cylinder warm up, I dried, cleaned, reassembled and oiled it and gave back to the customer just as good as new!

- *Wilson Sempf, Dowling, Michigan*

## **.22 RIMFIRE BROKEN SHELL EXTRACTOR**

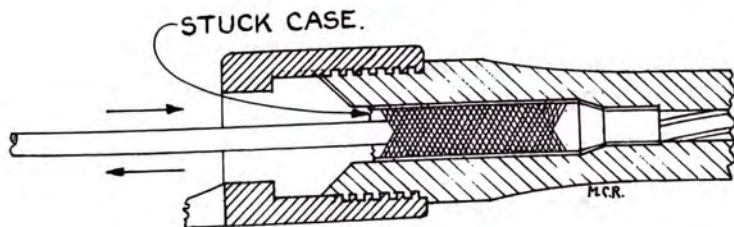
Problem: Customer using "Brand X" .22 ammo in rifle; upon extraction the shell head separates from the case leaving remaining piece of case stuck in the chamber.

Solution: Screw 12-24 tap into remaining brass in chamber and use cleaning rod to drive tap and brass out together via the breech. The 12-24 tap will securely fit and grip the brass, but is small enough so it will not damage the chamber. (Note: Best be darned careful not to damage the chamber walls!)

- *Charles Hirsch, Stanchfield, Minnesota*

## **REMOVING STUCK CASES WITH A .410 BRUSH**

Cartridge cases which are minus heads and stuck in the chamber after firing can often be removed easily by inserting a bronze brush as far into the neck as it will go and pulling it out.



I've found that a .410 size works the best for most rifle calibers. Once the brush is inserted in the case, the bristles dig into the case when the brush is pulled back out.

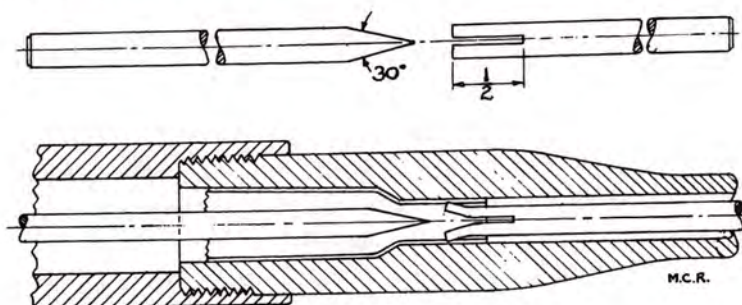
- *Ted Lewis, Calgary, Alberta, Canada*



## STUCK CASE REMOVAL

I had a 6.5 mm Carcano brought into the shop with a separated case stuck very tightly in the chamber. The customer wanted it out, so he tried and succeeded in making it worse, and I wanted to get the case out with as little time as possible. Here is how I got it out.

I took 2 pieces of green label drill rod of a diameter that could pass through the neck of the case. Then, using a Dremel tool and carbide discs, I slit one end of one rod approximately 1/2 inch, maintaining a 90 degree end. I put a straight 30° chisel edge taper on one end of the second rod.



With the bolt removed, slide the rod with the split end down the bore and into the case neck, and the rod with the tapered end in from the back of the action. When the tip of the tapered rod is fitted into the slotted one, hit the back of the tapered rod smartly with a small shop hammer. Take care not to penetrate the brass case with the drill rod and scar the chamber. The stuck case can then be driven from the chamber by tapping the slotted rod protruding from the muzzle.

The case came out surprisingly easy and it took longer to explain it than to actually get the case out.

- Bob McClendon, Fort Valley, Georgia

## BAND FOR WELDING GOGGLES

Cut off and split about six inches of your surgical tubing. Attach each piece to the side of your oxy-acetylene goggles. Overlap and tie with string at a comfortable tension. Mine have lasted over a year, and before, the elastic would stretch or break after a month or so due to heat and sweat.

- James Davis, Eastanollee, Georgia

## TALKIN' SHOP

The two partners in the gunshop decided to go fishing. Soon they were out in the middle of a beautiful lake having the time of



their lives. Suddenly a tremendous storm blew up and capsized their boat. One of the men began to swim for shore but his partner was floundering helplessly. "John," cried the swimmer, "can you float alone?" "That's one hell of a note," shouted John, "I'm drowning and you want to talk business."

- Dan Auget, Puyallup, Washington

## NO-STICK SILVER SOLDER

To keep silver solder from sticking, smoke the parts with acetylene (no oxygen) flame. Then clean only the parts that you want soldered together.

- Dan Plamondon, Crescent City, California

## NEEDLE WELDING ROD MATERIAL

Just that - weld small parts with sewing needles! If you have the broken pieces of a gun part, don't throw them away - weld them back together using sewing machine needles for your rod. I build eighty percent of my gun parts, and I have found that the needles, used as rod, are the only things that have the metal to "stay put". You do not have to temper any of the parts, and I have never had a part I've fixed this way come back to the shop yet! Use a small pair of vise grips to hold the needle when welding and a small tip on your torch. Don't work too fast and dip the parts in water to keep them from getting too hot.

- Fred Linzy, Porter, Oklahoma

## SPOT SURFACE HARDENING

The use of a hard surfacing rod such as the ones used to build up plow points, saw blade tips and so on is one of the handiest things I've found since silver solder. It is ideal for repair of worn sears, locking lugs and various other odd jobs. It flows at around 1400-1500 degrees F., but you have to be durned careful. Once cool, it is harder than steel - won't even spark on a grinder. A Dremel tool with an Arkansas stone is about the only way to cut it... even eats the teeth right off a file. (Note from Frank B.: Dad told me many years ago that one of the things he used to do in pistol accurizing was to resurface the sear/trigger mating surfaces with stellite for a really accurate trigger job that lasted! The secret was to get the surfaces shaped exactly first, then using a touch-plate, draw the stellite rod down to the size of a heavy thread - it works just like molten glass and can be pulled out to as thin as a hair. Then just "wet" the surface you want hardened with the stellite thread; don't puddle it. Gives a beautiful even flow and uniform covering. However - Dad says it does take a lot

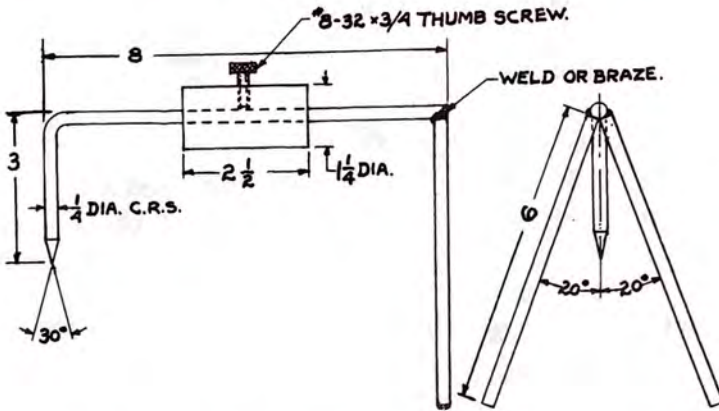


of stoning to finish up the job right, but in the end it is well worth it, for it is about the only way you can get a good trigger/sear surface on the unhardenable steels many of those guns were made of.)

- Charles Hall, Mayo, Florida

### WEIGHTED "THIRD HAND"

This is the "third" hand that I use when welding or soldering. The two legs forming an angle rest on the welding table or bench

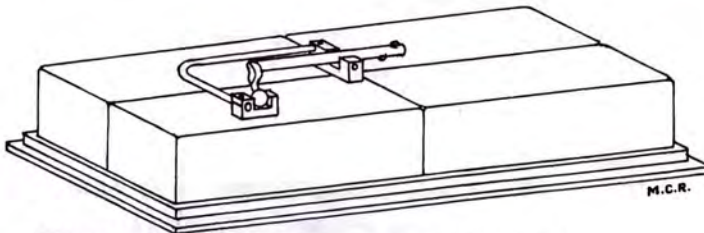


and the third (pointed) leg rests on the work piece. The sliding weight can be adjusted back forth to vary the pressure on the part. This little fixture works real well to keep the parts in the exact place you want them.

- Tommy Munsch, Prior Lake, Minnesota

### WELDING PLATFORM

A welding platform to set on my work bench was made with 4 fire bricks set on a 1/4" steel plate with a small rim of steel run-



BROWNELL'S BOLT WELDING JIG ON 4 FIRE BRICKS.

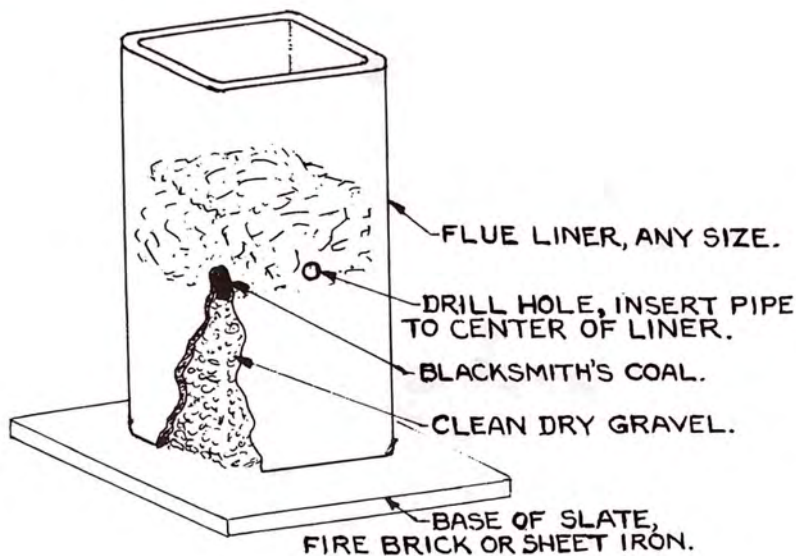
ning around the edge to hold the bricks together. Works great with Brownell's Bolt Welding Jig.

- Jack Thompson, Birmingham, Alabama



## HOME-MADE FORGE

I made up this home-made forge, and it works quite well for all my needs.

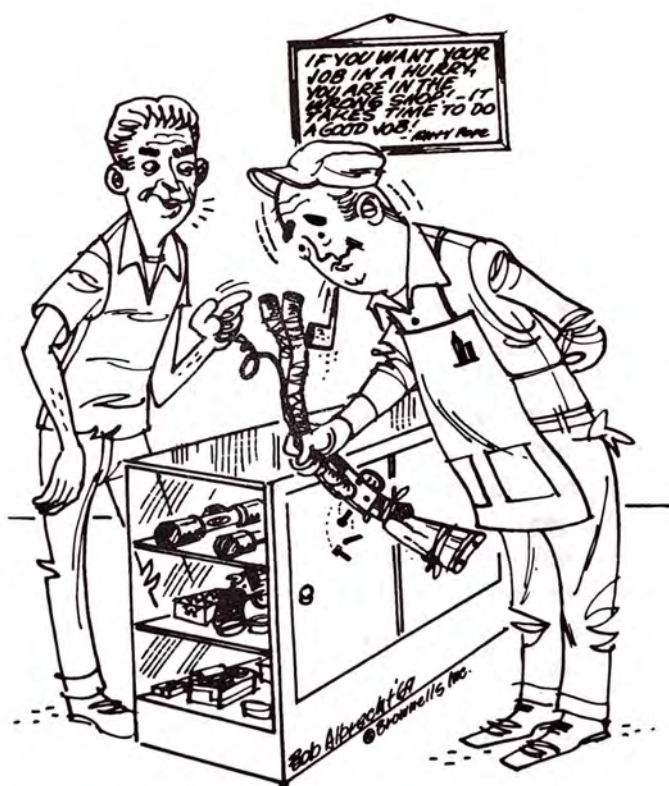


- Brian Lewis, Marbury, Maryland



## CHAPTER 11

# BUSINESS SAVVY



*"It was Grandpa's & we want it like new!"*

### BUSINESS LESSON

Once in a while, in the course of "growing up" in business, a person is lucky enough to have an experience which benefits him



for the rest of his life. The following is one of those experiences in which some very basic business and professional principles are involved. Following them helped my career. I believe they will do the same for you. It all happened thusly:

One miserable January night back in 1937, I was filling-in for the night man at the gas station I owned then while he was home fighting the flu. Along about 2 a.m. a car pulled in and a much fatigued individual got out and ordered a fill-up. While I was doing that he stretched, yawned and looked around at the station and the neon Shell gas sign, neon Shelllubrication sign, Goodyear neon sign, OK Tire Welding and other neon signs that lit the place up like a Christmas tree. After he'd paid me and I'd made change, he said, "Just who in hell owns this place?" In a real huff - 20 hours of continuous work will do things with one's patience - I shot back: "Damn it, I do." He looked at me a moment and says, "Hey, I'm damned tired. Let's go into your office and do some gabbing and I can do some resting, too." We went in and he stayed for a couple of hours. The gist of our "gab" has been with me ever since. It started out like this:

"Son," he says - he was maybe 40 and I maybe 26 - "I didn't mean to be cute out there, but let me ask you a few questions. Do people around here come down to your station because of the Shell sign or because - what's your name? - they're trading with Bob Brownell?" "Cause it's Bob Brownell," I says. "Do they trust Shellube for the grease job, or Bob Brownell?" "Bob Brownell." "When a tire blows out do they write to Goodyear or come down and chew you out for an adjustment?" "Me!" "And when they talk about the good service and a good place to trade and an honest guy to deal with, is it Your Name they use?" "Damnation, I hope so!" The fellow looked me square in the eye and said: "So why in the devil isn't your name plastered all over this gas station?" And for another hour or so he lectured and chatted along those lines, and why. Ever since I have followed that man's nighttime lecture in marketing.

I'm sure you get the message from the above as to how very important it is to have YOUR name involved in everything you do. To you old timers, I've gone into this one way or another a couple of times in the past, but for those who've only been with us during the last four or five years, let me repeat: In your shop name, letterheads, business cards, window signs and advertising, have your name prominently displayed. It is you, after all, they are going to be dealing with, and when you stop and think about it, every famous stockmaker, engraver, gun builder, gunsmith is known by his personal name - even tho he might also have a shop name!



Another point which most of you are aware of because it shows in your beautiful letterheads, but which is worthy of repeating for some of you newer ones in our fraternity: A good letterhead is extremely important when dealing with other companies in getting recognition as a legitimate dealer so that you will receive all the accompanying discounts and services. Your letterhead is YOU coming thru the door in the form of a letter. Present yourself well!! Be positive your letterheads have ALL of the following (you'd be surprised how many do not): shop name if you have one; your own name prominently displayed and what you specialize in or do; street address, town, state, phone number with Area Code. Also, have a spot for your Federal Firearms License number. Reduce the gunsmith decals way down and have these, too, imprinted somewhere on your letters. If done well adds a note of professionalism.

- Bob B.

## ON PRICING SHOP WORK

As the result of a query in the Newsletter, several of you wrote giving your thinking on how to establish shop prices and all of your letters were good. Larry Hauser ended his up by saying, "I like to explain 'why' on many occasions. If you watch the customer's eyes you can quickly see if you have made the point and kept a confidence." This reminds me of a bit of philosophy learned many years ago that has more meat than fluff in it. To wit:

The young graduate starting to work with his doctor father in the fitting and selling of eyeglasses had just been paid by his first patient. "Son," said the elder, "you only charged him the amount written down!" The son looked at his father and gave the classic answer: "So, what else?" The epitome of patience, the father explained how to price eyeglasses. "You hand the glasses to the patient and say, 'That will be \$20.00.' If there is no reaction, you say, quickly, 'for the appointment and \$15.00 for the examination.' If there is still no reaction in the patient's eyes, you add without a pause, 'and the glasses will be \$30.00.' If there is still no reaction you can add, 'plus \$5.00 for the case.' So, Son, you bring in \$70.00 instead of \$20.00 and we are happy and the patient feels he has been properly charged - because you stopped adding when you saw the right look in his eyes."

- Larry Hauser, Eugene, Oregon

- Bob B.

## TIP ON PRICING...IT'S WHAT YOU KNOW...

Fixed an old shotgun for a guy the other day and it took only



about five minutes to do the job. I handed it to the guy, he tried it out and was delighted. When I told him it would cost \$5.00, he darned near flipped and finally wanted to know what in "H" I did on it so quick that it was worth that much. I told him, "If I answer that it will cost you another \$15.00."

- Ben Newman, Agency, Iowa

## AND HERE'S WHAT SOMEBODY DID SAY

I was visiting a gunsmith friend and customer (Vern Johnson) last fall. He showed me a pair of Weaver bases a fellow had bought at a nearby town's discount store. Neatly pasted over the price of \$1.25 printed on the insert was a store tag, pricing the individual bases at \$2.50 each. Vern is retired military and the Poop Deck "Lecture" the fellow received for (one) having the guts to buy from a discount house and then expecting him to mount at discount prices; and (two) being so ★&¢%¢★#★&★ stupid as to pay double price was, as his wife put it, Classic!... We can't always do as Vern did, but sure warms the heart when you have heard from someone who does do it... Bless 'em!!

- Vern Johnson, Kimberling City, Missouri

- Bob B.

## CHECK THOSE COSTS CONSTANTLY

Sign in the shop of Chuck Wilcox; "Please Lord, let me sell what I have on hand for just a little more than it costs to replace it." And to this I think he should add: "...or fix it." This is an especially important prayer these days. You must keep a constant check on your costs of operation, depreciation, equipment and supply depletion and, above all else, what it costs you to replace. I know of two big bankruptcies this summer by outfits who forgot replacement costs and who knows how many small ones did the same. We need you - so be careful!

- Chuck Wilcox, Ellenboro, West Virginia

- Bob B.

## IT'S ALL IN THE COMPANY YOU KEEP

The Minister was walking home rather late at night after spending several hours with a member of his congregation who was quite ill. Just as he passed the local tavern one of his parishioners stumbled out the door. Taking the poor fellow by the arm, he guided him safely home and was about to leave when his wayward friend insisted, "Please, Preacher, come inside for just a minute. I want my old lady to see who I been out with."

- Fred Moulton, Washington, D.C.



## SHOULDER PATCHES FOR YOUR SHOP

During the last few years there has been quite a wave of special shoulder patches from quite a variety of manufacturers. Some of them are quite attractive but, they do not promote YOUR name. On patches this is okay and you do see a lot of them - however, Ron Plumlee of The Cop Shop sent in a very attractive shoulder patch advertising HIS place of business. Three colors: gold, white and black of a policeman against a gold star on a white background with "The Cop Shop" around the edge. Shooters are anxious to wear such patches and 99.9% of them are proud to display the name and emblem of the man or men who have made it possible for them to shoot better. (Note: you'll find the names and addresses of companies doing short runs on patches in the ad columns of the leading shooting magazines.)

- Ron Plumlee, Eugene, Oregon

- Bob B.

## USING THE GUNSMITH PATCH

The Gunsmith Patch idea has been very well accepted by you men as "your" patch - and that is just the way I hoped it would



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RURAL RT. #2  
PATASKALA, OHIO 43062

TELEPHONE  
614-927-9072

go. Even better, many of you are using the emblem as your professional identification on letterheads, business cards and statements and in your advertising. Again, a very sound idea. The card from Howard Pingle, above, is a beauty and if any of you want art copy of the emblem for business use, drop us a note and we'll send out at no charge.

- Howard Pingel, Patakala, Ohio

- Bob B.



## THOSE LITTLE CUSTOM TOUCHES

After I have reblued a customer's hunting gun, I use a Lacquer Stik in white and red to fill in the barrel stampings. I use white for the model number, caliber, gauge, etc.; and red for Manufacturer's name. I do this free of charge. It takes only a few minutes time, and I have had quite a few favorable comments on it as everybody is pleased to get a little something extra for nothing. (Besides, it also takes the guy's eyes away from any little mistakes you may have made.)

(Note from Bob B.: this is a great suggestion, and one of those little services that keep the customers coming back for more!)

- J.R. England, Duncan Falls, Ohio

## ALWAYS REMEMBER, MY SON...

Dealing with the public can be pretty trying at times. Always try to keep this in mind: Treat everyone with politeness, even those who are rude; remember, you are courteous to others, not because they are gentlemen, but because you are a gentleman.

- Bob B.

## POLAROID COLOR SHOTS

Whenever we get in a real "dog" for restoration, especially when its an older gun such as a Win. 97, an octagon barreled gun, etc., we take several good color photos before we do any work. When the gun has been refinished and returned to the customer we always include at least one "before" photo. It impresses the customer, and you can bet that when he is proudly showing off old Betsy to his friends, he will also pass around the "before" shot. Potential customers not only see what we have done but what we had to start with! Also, we've found that Rem. 742 charging handles are uniformly rough and burred. Often to the point of causing the owner quite a bit of discomfort. Now, whenever we do anything to a 742 we cut a small piece - 1/4" or so - of surgical tubing and fit it over the charging handle. It fits quite secure; we've never had one come off during use - yet is easily removed. Makes the rifle much more pleasant to shoot and a much happier customer.

- Reid Coffield, Rutherfordton, North Carolina

## FROM ANOTHER POINT OF VIEW

The sweet young thing had been a bit too involved with her social affairs to study for the pop quiz in her course in "American Society and Modern Technology". In answer to the question, "What is the primary contribution of the automobile to western



society?" she quickly responded, "It has all but eliminated horse stealing!"

- Bob B.

## GIVE THEM A "BEFORE AND AFTER"

This I have used very successfully. How many times have gunsmiths had customers turn down a job simply because the customer was not sure how it would look when done? Well, I've solved that problem. I've taken 3 old cracked buttstocks, refinished and rechecked only one side. One is an oil finish, one high gloss, one satin finish. I leave the other side alone, kind of showing a "before and after" effect. I have also 3 old 1917 Enfield bolts: one was left alone, another polished, another jeweled and mounted on a board. (This has sold more jewelry jobs for me than merely asking the customer if he wanted it done.) I have a barrel half blued, half rusted - another polished to a DeLuxe gloss job - an old Mauser barrel blued and fitted up with a William ramp and WGOS rear sight - an old 1917 cracked Eddystone Enfield with the ears turned off and a jeweled bolt in place. (Very effective.) Right now I'm staining and refinishing and recutting the pressed checkering on a cracked Savage M24 buttstock. Flipping this over to the unfinished factory side makes it look like an entirely different stock.

I have an old set of soft soldered doubles that have separated. (I got for a song. Needed the action for parts and a forend iron.) I'm bluing these (Baker method) - just one barrel. I guess you've got the idea by now. Show them a before and after. This also shows your customers your quality of workmanship at the same time. But, you must leave these out where the customers can see them to do you any good.

(Comment by Bob B: The most effective use of the above I've ever seen was at the NRA Convention in Seattle. A gunsmith there at the show had a set of L.C. Smiths in beautiful cases. One was just like new inside and out. Pick up the other, which looked like the other, and what a shock. The part that was down in the case was "as is" - and "as is" had been what it looked like prior to bluing. The original owner had seemingly stored it in an old barn for years. Rusted and pitted horribly. But, what an effective and memorable way to impress on the viewer's mind, and memory, the ability of that gunsmith to take what seemed to be junk and turn it into a thing of beauty...)

- James Smith, Evans City, Pennsylvania

## IT'S SERVICE THEY WANT

For the timid, just remember this: "You gotta throw a few dice



every day or you might be going around just luckier than hell and never know it!" - from John Morrissey, our local newspaper editor. From BB.: mine's a bit different but sorta along the same lines: "You might be the poorest fisherman in the county, but if you'll throw more plugs at 'em from can see to can't see, you'll catch as many fish as the big boys . . . maybe more!"

The above doesn't apply muchly to the following, but in this situation you do have a dice throw or a special plug to toss which nobody else in the business has - "Professional Service" for the products you sell, the work you do. Believe me, in this day and age of I-don't-give-a-damn-what-happens-after-I've-got-your-money on the part of the big discount chains (and going to get worse as the years go by) you've a mighty weapon in your hands if you'll just use it to full advantage. The growing multitude of people who've been badly hurt because they can't get it fixed where they bought it, and nobody else will fix it because they bought it where they did, makes it easier for you to get your point across. Get this "personal service" in your sales pitch. Hells Bells, maybe it'll work on only 25% of the discount buyers who come to you. That ain't a bad percentage, you know, when you'd have lost the sale if you hadn't tried. On top of that, the ones who didn't listen will get screwed eventually, sure as the Second Coming, and then the old bread on the water will start coming back to you - many fold!!

- John Morrissey, Montezuma, Iowa

- Bob B.

## IN THE INTEREST OF SELF PRESERVATION

At one of those bull sessions at the SHOT Show, a couple of very close and dear friends were there, men who are at the top of their profession - one a gunsmith and the other is absolute tops as a forensic ballastician (one who appears in court as a recognized expert and authority on all phases of firearms). The gunsmith, whose shop turns out thousands of guns a year, has an iron clad policy: every gun that goes out is test fired five times slow fire and five times ultra-rapid fire by the man who did the repair work - who then signs a statement, in duplicate, that the test firing was done. One copy stays with the shop, the other goes to the customer who is charged a very nominal fee for the test shots. All shooting is done with factory loads. NEVER, but NEVER with hand loads or custom loads. Straight fodder. It was agreed that altho who knows what a jury will do, having such information at hand could be most valuable in establishing a strong defense.

- Bob B.



## PERSISTENCE AND DETERMINATION

Nothing in the world can take the place of persistence. Talent will not: nothing is more common than unsuccessful men with talent. Genius will not: unrewarded genius is almost a proverb. Education will not: the world is full of educated derelicts. Persistence and determination alone are omnipotent... "I like this because it adds up to most gunsmiths I know: a determined bunch of individuals who don't know a job they can't do well!"

- Mrs. Bob B.

## PROFESSIONALISM AND COMPETENCY IN YOUR SHOP

As gunsmiths, all of us are concerned with safety and professionalism and this is as it should be. Who of us has not worried at times about product liability and the specter of a law suit resulting from an accident involving a gun that we have serviced? We have all given thought as well to the means by which we can enhance our public image as conscientious and knowledgeable craftsmen. In my own shop I developed several procedures over the years that were implemented as a response to these concerns.

I had one hard and fast rule relating to firearm safety; with very few exceptions, **ALL** firearms were test fired prior to their return to the owner, no matter what type of work was done. In addition, when the owner picked up his gun, it was both test fired and the functioning of the safety devices were checked in his presence! It took a little extra time, but when my customer walked out with his rifle, shotgun, or handgun, both he and I knew that it would function flawlessly and safely. There was never any doubt or reason for concern.

I also discovered that I could often provide my customers with important information during the final test firing. You would be surprised, for example, at the number of Ruger 10/22 and Marlin .22 auto owners who are not aware of the fact that the bolt can be locked to the rear in an open position!

I mentioned that there were a few exceptions to my test firing rule. If, for any reason, a gun was not test fired, the repair tag was stamped "Not Safe to Fire" and the customer was asked to sign and date it. I kept all repair tags as a part of my permanent records. This was also done if the gun was actually found to be unsafe. In this way, I could always document the fact that I had informed my customer of any safety problem.

While there were a few isolated complaints, most of these relating to "a waste of good ammo", the vast majority appreciated my concern. They saw this as an indication of professionalism and competency. It went a long way towards developing a loyal clientele.



and helping my business to grow.

In addition, whenever I did any sight work, barrel work, or any other job that was directly related to accuracy, I would test fire the gun at a nearby rifle range. At this time I would make notations on the target regarding the distance or range, the type and brand of ammo, and any other pertinent matters that might affect accuracy. Later when the gun was completed and picked up, I would give this target to the customer. Because of this, I was never faced with a customer later complaining that the sights were mounted incorrectly, the barrel liner was defective, etc. I knew how the gun performed, and I was able to provide my customer with documentation of this performance. When compared to a nearby competitor, whose testing procedure consisted of leaning out the front door and blasting away at a beer can on a dirt bank, this certainly had a very positive effect upon both my image and reputation as a professional gunsmith.

These are but a few examples of the little thing, the simple things, that all of us can do to both provide safer, better service for our customers as well as enhance our reputations as good, competent gunsmiths.

*- Reid Coffield, Rutherfordton, North Carolina*

### **MY HONOR'S JUST FINE...**

The old Judge was stepping down from the bench one day, when he tripped on the top step and fell all the way to the floor. The young lawyer rushed to his side and said, "I hope your Honor is not hurt, sir."

"Hell," replied the crusty old Judge, "My honor is fine, but I think I broke my damn leg!"

*- Bob B.*

### **FIRE AND INSURANCE**

I suspect that no other possible catastrophe wakes up us guys in the gun business in the middle of the night as does the specter of fire in our shops. It can be a catastrophe if insurance is not adequate - bust a fellow and cause him problems for years to come. Only once in my life have I heard of a total fire wipe-out being a business blessing. Has to do with my banker when he was younger (much!) and in a different town. He had this customer who owned a large grain elevator. Had it paid for. His home paid for and a farm paid for. All of this because of the way he did his income taxes. The banker just gave him the devil for the way he did it but he, the elevator operator, knew his way was honest and right: at the end of the year he would call the bank and get his checking ac-



count balance. If he had \$2,000 balance, that was his profit for the year. If he owed the bank \$2,000, that is how much he lost for the year and turned in his report to the IRS that way. And every year the banker would say, "Someday, friend, you're going to prison." One summer night the elevator caught on fire. It was in just a hamlet, so everyone was there watching it burn to the ground. At the height of the flame here came the elevator owner, dirt-smudged, sweaty, panting and bright-eyed up to the banker. "Thank God," he says, "I managed to save all my records." The banker was aghast. "You stupid so-and-so," he almost screams, "get the hell back to that fire and throw those records into it." What do you know, the fellow did and, guess what, in a month he drew an IRS audit and came out smelling like a rose. Died years later a rich and respected man in his community.

Not everyone comes out of a fire that fortunately, and that is the basis for the lesson for today. I do not know what kind or how much insurance you might have, so I'll take a hypothetical case and go from there. . . Your gunsmith business has started to grow a bit and you decide it is time to protect yourself with some good fire insurance. (The "you" in this illustration is the hypothetical gunsmith.) You go to your agent and tell him what you have in mind and that there isn't a whole mint of money available, but insurance is important and some should be had. The agent agrees, naturally, and the two of you work out a suitable 80-per-cent Co-Insurance policy for \$20,000.00 which sounds like a mint! Or, maybe you think in your mind, "That might not be quite enough but it is all I can easily afford right now, and as things grow, I'll increase it." Things grow a little, but you don't increase the value of the policy. Comes the hunting season and you have a flock of guns in the shop over the week-end - and that week-end the shop has a bad fire. You call in your friendly insurance agent, you go over the losses and decide you had about \$45,000.00 worth of guns, inventory and equipment on hand at the time and suffered a loss of \$15,000.00.

Under the above circumstances a fellow would assume he'd get the full loss from the insurance company with no questions asked. Such is not the case. "Co-Insurance" means that you and the company are in it together. If it is 80% Co-Insurance, the company carries 80% and you carry 20% of the total insurable assets. Thus, if what you have on hand at the time of a fire is in excess of the value of your insurance policy you get paid on a ratio that is determined by the difference between eighty percent of the value (\$45,000) and the actual insurance in force (\$20,000) at the time of the loss. Trying to figure this out and come up with an answer



gets a bit hairy. I've been at it now for two days and can come up with the right answer but cannot properly explain it. So! The Iowa insurance companies have a simple formula they use to handle 80% Co-Insurance. You divide the insurance coverage (\$20,000) by the Insurance Required, (\$45,000) to cover what you had on hand. Then you multiply that by your loss (\$15,000) and come up with how much money you will get. In this case, \$6,666.66. And that is horrible! A real shocker. What to do? Get together with your agent and have him explain to you why you must have your Co-Insurance up to the actual value of what is on hand. Then, remember to up-date it during the year as inventories and guns in for repair increase.

- Bob B.

### **"BURN OFF" STEEL WOOL OUTDOORS**

While on "fires" - We get letters along reminding us to remind you to NOT burn the oil off steel wool in your gun shop, but do it out-of-doors. Steel wool can burn like blazes and sometimes is put into survival kits as tinder to help start fires. Also, to remind you that when a product says "low flash point" or "flash point of 80°F." that means it burns very easily. Keep away from fire and open flame... could "burn your house down" mighty easily.

- Bob B.

### **HOW TO FIGURE PERCENTAGE OF PROFIT**

Most people, including every friendly banker alive, confuse interest on investment with percent of profit on sale price. Everyone who's gotten through grade school arithmetic knows that if you want to make 33-1/3% mark-up (interest on investment) on an item costing \$1.00 you'd come up with \$1.33-1/3. But that is NOT 33-1/3% on selling price which is the figure you as a dealer are interested in. You must know (you HAVE to know) the profit on the sale but how do you go about establishing a retail price on an item that costs you \$10.00 and will give you a 33-1/3% profit on selling price. Believe me, darned few people know how to do this little trick. Once you know how, it is quite simple.

What you do is this: subtract the percentage of profit you want to make from 1.00 Divide your answer into your cost. That answer is your selling price. Example: an item costs you \$9.00. You want to make 40% profit .40 from 1.00 is .60 Dividing .60 into \$9.00 gives you a selling price of \$15.00 to make a 40% profit on selling price.

Write the above down and keep somewhere handy. You'll want



it many times in years to come.

- Alan R. James, Green River, Wyoming

- Bob B.

## PARTS INVENTORY SYSTEM

The small parts storage in a recent Newsletter was especially interesting because I have been trying for 15 years to find a decent way to store small parts in such a manner that they could easily be found. About a year ago I bought a dozen forty-drawer plastic cabinets and numbered the drawers. Then I bought a Rolodex file, put what information I wanted on the cards, and arranged the

Part # and name	19478 Action Bar lock spring
Drawer #	49
Retail price	.50
Cost	.33
Manufacturer	Rem.

cards in part number order by manufacturer so that they could be easily found.

Quite a number of different parts can be put into one drawer so that three or four cabinets will hold a large number of parts. The larger parts that do not fit into the drawers are put into a box.

- Jerry Wakkinen, Waunakee, Wisconsin

## TWO GUYS WENT INTO BUSINESS...

...and decided they would really go to town if they sold everything for a buck less than it cost. At the end of the year they found they were bankrupt. Says one to the other: "Dammit, man, I kept telling you and telling you 'We gotta advertise more'."

- Bob B.

## SIGN SEEN IN MIDWESTERN GUNSMITH SHOP

"We require a deposit of 50% from customers we don't know and 100% from some we do know!"

- Bob B.



## THE PROFESSIONAL GUN DEALER

Back in the pre-NSGA Show edition of this magazine, the Editor raised the question of what appeared to him to be a growing change in the appearance, style, and business philosophy of many gun retailers. Prompted by Jerry's remarks, most of which I agreed with, and by his suggestion that we look further into the matter, we did some digging at the NSGA gathering.

We didn't spend much time looking at the larger retailers since, with very few exceptions, we know from past experience that they are, for the most part, all highly professional businessmen. If they weren't, they'd not have achieved the levels of success they now enjoy. What we did investigate was the small-to-medium retail gun/sporting goods shop operated directly by the owner or under his close, day-to-day supervision.

We wanted to determine how the present generation of successful people in this business compare with some of those of, say, 10 years back. Our inquiries began at the top, with executives of the major arms producers, importers and distributors, then on down through salesmen and factory reps. These people are vitally concerned with the success of their retail outlets and keep a very close eye on developments in the field.

The basic question, with a few variations due to geography and products, was simply, "How does today's successful gun retailer compare with those of several years back in regard to financing, business approach, technical knowhow, appearance and deportment?"

While answers varied in a number of ways, the general consensus of opinion was that today's successful dealer presents a somewhat different picture. Whether just a beginner or with a few years experience he is likely to be: a) better financed, more likely to be operating on borrowed money and/or working with a more or less silent partner who supplies financing; b) more knowledgeable of basic business principles and procedures; c) more concerned with proper accounting and the keeping of essential records; d) less flamboyant in speech, manner, and dress. In short, those that have grown and succeeded are less amateur, more professional than before.

Keep in mind that those aren't just my personal opinions, though I do hold to most of them. They represent the assembled comments of nearly a score of highly-placed arms industry people; people whose own success depends considerably on the performance of dealers.

Then, we asked what they felt were the most common causes of failure of the gun retailer, if not failure, stagnation to the point



that the business really doesn't make more than a bare living.

The answers were almost the opposite of those appearing above: a) lack of adequate capital; b) lack of business knowledge; c) lack of proper records; d) failure to analyze particular market areas and plan accordingly; e) lack of product knowledge; f) a tendency to treat the business as if it were a hobby.

One prominent industry management party made the statement that in all his experience he had never encountered another field in which so many people tried unsuccessfully to convert a hobby into a business. He emphasized that a liking for any commodity, guns or otherwise, is a poor single basis on which to start a business unless all other essential factors are equally present. In fact, he said he would rather support a man who disliked guns if that man had the other abilities and interests mentioned; that the gun enthusiast often simply can't subvert his real interest enough to function as a business man. Too many cannot separate business and hobby interests and assign them proper priority.

The typical small gunshop begins when an enthusiastic shooter and/or collector realizes that some of his acquisitions are worth a good deal more than he paid, and that he can realize a substantial profit by selling them and using the proceeds (hopefully) to buy more which can also be sold profitably. He reasons that by following that pattern he can operate without additional capital or, at least, with only a very small amount.

Unfortunately, this results in only a very limited inventory which, in turn, attracts only a small number of customers and produces slow turnover. He cannot order well in advance or in economical quantities for lack of operating capital. Sooner or later he decides that by opening up a real gunshop and devoting full time to it he can make more money faster and build both inventory and sales. It usually doesn't work out that way. With overhead eating up the small profit, there is never enough money to increase inventory, spend on advertising, and/or promotion. Coupled with inadequate records (usually) this results in the new shop going downhill from the moment its doors open.

There isn't any doubt that a keen interest in and an extensive knowledge of both guns and shooting can be of immense value in operating a gunshop. The same goes for knowledge of gunsmithing and handloading. The customer respects knowledge of what he wants to buy, make no mistake about that. He may be attracted by flamboyance in the form of leather vests, high-heeled boots and ten-gallon hats or the nicked Single-Action carried by the fellow behind the counter — but those things don't encourage him to buy nearly so much as a feeling that you know the subject well



and can give him straight answers to his questions.

This doesn't mean you have to be a five-star expert in all fields, but it does mean that you'll have to learn all you can about the subjects of most interest among shooters in the area your shop services, rather than just those things of personal interest to you. This isn't a requirement peculiar to the selling of guns — it applies to every field, from the door-to-door vacuum cleaner salesman to the fellow peddling used airliners. They all must know at least enough to be able to answer any reasonable (and some not so reasonable) questions about their wares.

That's where the hobbyist is way ahead of many other small businessmen. He already knows more about the products he's pushing than the majority of his potential customers. But, that isn't enough. Not nearly enough to make a success (and a profit) of gun selling. You have to look and act like a businessman — a professional. A professional who can be objective enough to graciously allow a customer to buy what he wants rather than what you think he ought to have. Professional enough to take enough time at the end of each day to make certain all records, especially those required by GCA 68, are brought up to date. Professional enough to recognize that the average customer (as opposed to the true gun buff who will forgive anything if you have something he wants) is far more impressed by knowledge and competence, and salesmanship, than by your taste in wild shirts and silverstudded belts. Professional enough to realize that you must anticipate seasonal demands and prepare to meet them well in advance. Professional enough to admit that you really do need to burn some midnight oil and learn business and accounting procedures. Professional enough to know that customers really do prefer a clean, neat shop. Professional enough to know that keeping a bottle handy in the back room will attract a damn sight more freeloaders than cash customers. Most of all, professional enough to acquire, at whatever cost and inconvenience, a sound knowledge of small business principles and procedures.

The world is full of amateurs in all fields, but it often seems more of them are found in the gun business than any other. By general definition, an amateur is one who engages in a sport or other activity but is not paid for his efforts. You can be an amateur and avoid making money by simply ignoring good business practices, by operating on a shoestring, by giving all your friends discounts, ad infinitum. Yes, you can be a popular amateur and put your wife to work for grocery money, or you can begin to function as a professional and have enough extra next year for that month-long hunt you've always wanted to take.



There are many successful part-time gun sellers. They work at it only a few hours daily in addition to their regular jobs or professions. Some do it to support shooting or collecting activities, others to pay off a mortgage, or, just for playing and drinking money mama can't control. Many of today's shop owners started that way and financed their first full-time shop from such earnings. But to do so, they worked at it as professionals; they didn't treat it as a plaything or a game.

A good many small shop operators seem to feel they are something special – apart from the business and professional community of their areas – simply because they deal in the exotic, exciting, and glamorous firearm. Hogwash! In the final analysis, the gunshop operator is just another small businessman bound by the same rules and responsibilities as any other. As soon as he realizes that, and also that customers will buy from him even if he wears a coat and tie and that he's equal (no more, no less) to the druggist and grocer, then he's on his way to becoming a professional.

Whether you wind up as a flamboyant amateur to whom people point and say, "he sells guns"; or an acknowledged and accepted member of the local business community is entirely up to you. I just want to point out that the successful dealers now fall far more often in the latter category. Nuff said.

- Maj. George Nonte, Reprinted by special permission of Jerry Rakusan, Editor, **The Shooting Industry Magazine**, March 1970



## CHAPTER 12

### HUNTING & RELOADING

**E Pluribus Unum**



**Erin Go Bragh**

**The Highland Fling**



*Position Shooting In Days Of Yore*

#### 'GLAS RACK PATCH

A couple of years ago, while downing a 5-point bull Elk, I chipped a good-sized piece out of the antlers. The tine subsequently snapped

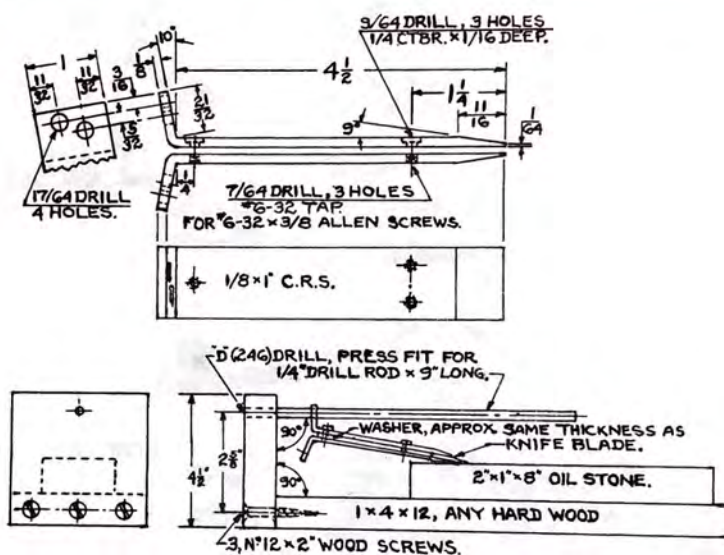


off at this weakened spot. So, I mixed up a batch of Acraglas, stained it to match the color of the antlers, stuck the piece back on and filled in the chipped portion. As the glass was setting up I put in the striations to match those on the antlers, then sanded the spot lightly to give it the right texture. Looks like the break never happened.

- Edward LaClare, Col. USAF (Ret.), Colorado Springs, Colorado

## KNIFE SHARPENING FIXTURE

The difference between sharpening a knife and REALLY sharpening a knife is being able to hold the blade at a constant angle while stroking it on the stone. I made the following fixture



to simplify and assure this, and it works so well that I thought others might want to try it.

Sliding the upper hole on the rod gives any knife an edge you can shave with, about 18 degrees, and the lower hole gives you a little more sturdy edge of about 21½ degrees. If you use a stone of different thickness, block it up so it's working surface is one inch above the base. Just be sure that the base angle and the hole for the drill rod are at 90 degrees so the drill rod will be parallel with the base.

- M.C. Ray, Cleveland, Ohio

## TAKE ALLEN HEAD WRENCHES ALONG

With the increased use of Allen head screws by the various firearms manufacturers, (and I welcome the change), problems can



arise. While spending 9 years in the field as a part-time big game guide in Alaska, I found that nobody, but nobody, carries Allen head wrenches in their packs. Whereas a knife blade or something can always be found to fit a slotted head screw, there is just nothing that can be substituted for an Allen head wrench.

I started to carry a set that would fit scope mounts and bases, trigger shoes and guard screws to take care of my hunters, but that's not the real solution. Since that time, all custom rigs and any other Allenhead equipped job that leaves my shop goes with wrenches included. On some jobs I inletted them into the buttstock, under the recoil pad or buttplate. Release agent provides a good "skin" on the wrench. Again a standard screwdriver or pocket knife can be used to remove the pad and get at the wrenches in an emergency. On other jobs that are equipped with a lined sling or strap, I make a small slit in the lining, near the lower end, and insert the wrench. It hardly shows and it's there when needed. Customer choice, of course.

- *Dick Devereaux, St. Ignace, Michigan*

### **SIMPLE SNAP-CAPS**

Two ways - one is to take a fired shell, punch out the primer, and in its place insert a hard eraser that comes on ball point pens. These erasers never work very well for what they are intended, anyway! The other one also uses a fired hull. Fill the primer pocket with GE's Silicone Construction Sealant. Cut the shell off to a length of about 1-1/8" and fill with leftover Acraglas. Plastic cases work best for this.

- *Fischer's Inc., Billings, Montana*

### **REFORMING SHOTSHELL SHOT CUPS**

When reloading shotshells with the plastic shot cups, the fingers of the shot cups get distorted, especially those that are in the sacks at the bottom of a large box. Makes them difficult to impossible to load properly. I dump one or two sacks of the shot cups in the electric clothes dryer and run it for 10 minutes or so, then spread them on some newspapers to cool. The fingers reform to their original shape, enabling you to load them much easier. (Carroll doesn't give temperature - and, too, you want to check your dryer to be sure that plastic shot cups won't cause a problem.)

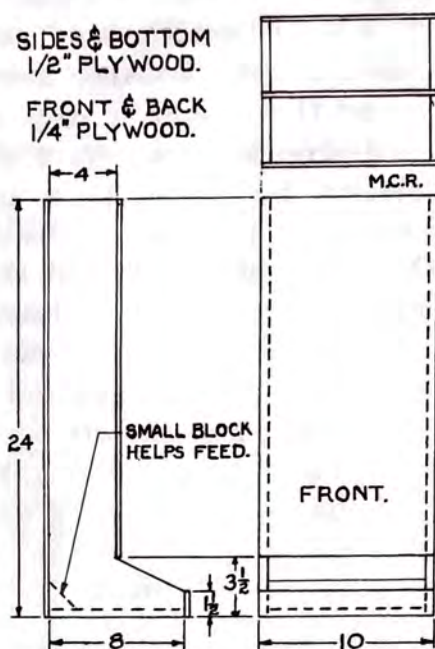
- *Carroll Haines, Port Angeles, Washington*

### **SHOTGUN SHELL HULL STORAGE**

I store the empty shotgun hulls I keep for reloading in these handy bins. I made several out of plywood and they keep the hulls



from rolling all over the reloading bench. You can also use them to rotate a batch of hulls for a uniform number of re-loadings.



I think the only critical dimensions are the 4", 8", and 3-1/2" opening. Otherwise you can make it as tall or wide as you wish. The size shown in the drawing will hold approximately 300 12-ga. hulls.

- Clifford Sichta, Lanark, Illinois

## THE CAMP COOK

It seems a group of hunters were out for the fall hunt and couldn't decide who was going to do the cooking. One guy finally volunteered, but said, "The first complainer has the job from then on." Everything went fine until the cook tired of the job, so into the beef stew that night went a large portion of dried "prairie cord wood". That night not a word was said until one of the younger lads jumped up with a mouth full of the stew and a beet-red face and hollered, "This stuff tastes like a buffalo herd walked through it!!" Realizing that he had goofed, he quickly added, "But that's the way I like it!!!"

- Dave Helper, Austell, Georgia

## 6MM SIZING

The 6.5 Jap neck sizing die is perfect for the intermediate stage when taking the .284 down to a 6mm. It takes it half way down and then the 6mm die will bring it on down to .243.

- Richard Turner, Mineral Wells, Texas



## SAVING BRASS FROM THE WIN. MODEL 100

Big problem with auto-loaders shooting off a bench is the tendency to scatter brass all over the landscape. I've found a way to solve this with the Win. Model 100 by filing a flat on the opposite side of the gas cylinder and then rotating the cylinder 180° when re-installing. The gas coming out of the barrel port then can't activate the operating slide guide assembly and connected parts. The arm simply operates as a T-bolt mechanism. I've had no extraction problems with either factory or hand-loaded ammo. Just pull back on the cocking lever and dump them out on the bench.

- *Glimn's Gun Shop, Bark River, Michigan*

## ACRAGLAS REINFORCEMENT FOR MOULD HANDLES

As some of you know, the Lyman 4 cavity mould handles have a tendency to loosen and even split after being used for a while. I now take all the handles and plug them about half way with a piece of wood. I then file shallow notches into the metal tangs. Next I use some regular consistency Acraglas to fill the upper portion of the wood handles, slip in the metal tangs and let it set up for at least 48 hours.

Since I started doing this I haven't had a single handle break or come loose.

- *Denis Bukin, Munster, Indiana*

## FAST SET-UP FOR POWDER MEASURES

For years, when setting up my powder measure, I would adjust and throw, adjust and throw, until I finally hit upon the right setting. Now I've got it down to almost a science. I weigh out a charge, drop it into the drum bore, rotate the drum 90 degrees and slowly close the bore by screwing in the adjustment knob. When the bore with the powder is forced against the side of the measure I now know that I have just about the right charge and adjustment. With a little practice I can get it down right on the money in one or two minor adjustments. Sure cuts down on the set-up time.

- *George Muench, Orlando, Florida*

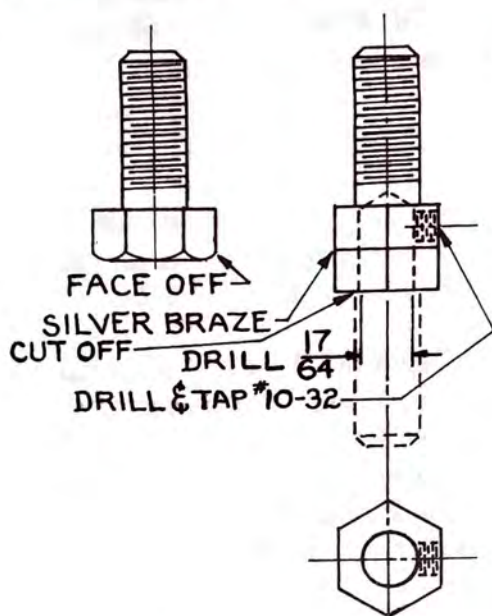
## TOP PUNCH ADAPTER

I have Lyman, Saeco, and Cramer cast bullet sizer-lubricators. However, there have been times when I wanted to use the Saeco and had Lyman top punches only. I racked my brain for a long time trying to figure how I could use the Lyman "G" punches in the other two. I finally got a brainstorm and made up this little



adapter.

Face off the heads of two 5/16 - 24 X 3/4 machine screws.



Silver solder the heads together, then cut off one shank.

Drill a 17/64" hole to depth of Lyman "G" punch shank.

Fit in lubricator and mark flat nearest to front, then drill and tap for # 10 - 32 Allen set screw.

- Henry Mar, Brookings, South Dakota

## GRAPHITE CASE LUBE "CASE"

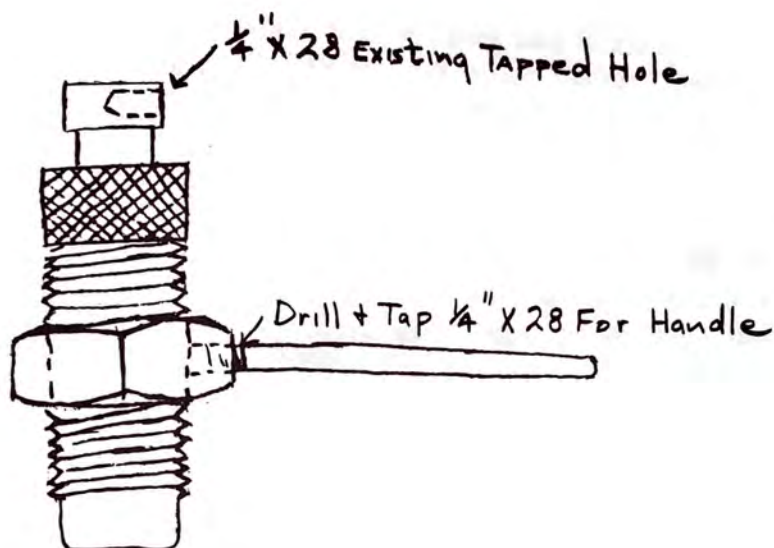
Lubricating case necks with flake graphite is as messy as heck. So I took an empty 12 ga. case and mounted a short cleaning brush of the right size inside the case in the primer flash hole with epoxy. Fill this case about half full of the graphite and dunk the cases down in over the brush. When you pull the case out - and off the brush - the case is lubed, and the extra graphite stays inside, not spraying all over you and your loading bench.

- J.M. Healy, Houston, Texas

## BULLET PULLER HANDLE

As you know, the Forster Bullet Puller employs a large hex nut as a locking collar to the reloading press. I used to have to hunt all over the shop for a wrench every time I used the puller. No more! I drilled and tapped one flat of the hex nut to take the threaded end of the collet draw nut handle. Now the handle is used





for both the draw nut and the hex nut. Hope someone else can use this idea!

- Greg's Custom Guns, Phoenix, Arizona

### MOULD MALLET

I have found that your No-Mar Hammer makes a terrific bullet mould mallet, especially the 1¼" and 1½" sizes with the nylon tips. I've used one at least 100,000 times, and it is still almost like new, and best of all, NO damage to the mould blocks.

- Denis Bukin, Munster, Indiana

### A TRUE MIRACLE

After bragging about his ability and skill as a marksman, the hunter took careful aim on the lone mallard that flew overhead. "Watch this," he ordered his companions. He fired . . . and the duck flew on. "My friends," he solemnly intoned, "we have just witnessed a true miracle. That dead duck still flies!"

- Ken Raynor, Montezuma, Iowa

### POWER CASE TRIMMER

Had to trim 5000 .30-'06 cases sometime back and the prospect of this using my hand case trimmer just did not appeal to me. The idea of spending money for a power case trimmer appealed even less.

So, found a Flexloc nut that would fit the cutter when the handle was removed. Silver soldered a 1/4" piece of drill rod in the nut and then threaded the nut on the cutter. Chucked the rod in my lit-

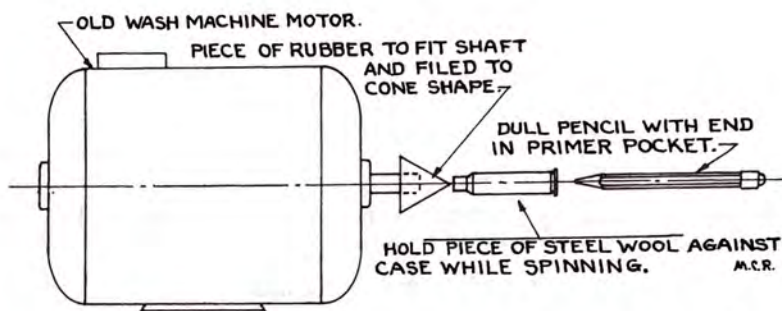


tle 1/4" electric drill and had me the dandiest "power" case trimmer I've seen yet. By using a hand drill with adjustable speed, I have a power tool that will do just about anything that I need from a case trimmer.

- George Muench, Orlando, Florida

## HOMEMADE CASE POLISHER

I've enclosed a sketch of a simple case polisher made from parts that I had lying around my shop. All you need is an old electric motor (I used an old washing machine motor); a piece of rubber



ber fitted to the motor shaft and filed to cone shape; a dull pencil to fit into the primer pocket; and some steel wool to hold against the cartridge case while spinning. Does the job quickly, is easy to make, and cheap too!

- L. Carson, Chadron, Nebraska

## STUCK MEDIA

When using either a tumbler or vibrator to clean cases, be sure to check the flash hole in every case after cleaning. Polishing media lodged in the flash hole will cause problems if not removed.

- Ken Raynor, Montezuma, Iowa

## CARTRIDGE CASE CLEANER

For years I've been looking for a good cartridge case cleaner that's completely safe, easy to use, inexpensive, will not discolor the brass and can be handled with bare hands.

Your stock rubbing compound was the answer, and the way I use it is quite simple. Hold the dirty case in one hand and in the other a felt pad or wool rag with a small amount of the compound on it. Start rubbing - in no time the cases will be bright and clean looking.

- James Mullis, Cadwell, Georgia



## BLOW IT OUT YOUR BORE

While I'm at it, tell the muzzle loader boys when they load their ball before the powder, take the nipple out, stick an air gun in the hole and stand clear of the muzzle.

- *Carter's Custom Guns, Fountain, Colorado*

## PREMEASURED BLACK POWDER HUNTING LOADS IN PLASTIC TUBES

A couple of years ago I was looking for something to use to make up premeasured loads for our black powder deer hunting season. I use a mini ball and wanted to carry lubed bullets and measured powder together for quick reloading. I used your half inch cellulplastic tubing with a cap at each end and a trimmed cap as a divider between powder and bullet. It worked real well.

- *Andy Robinson, Lapeer, Michigan*

## REACHIN' OUT

The discussion around the pot-bellied stove at the gun shop had gone on for some time about the long shots that were made by a couple of the local "experts"!

Finally, the old timer could stand it no longer: "I'm sure as the devil not impressed with a little ol' 300 or 400 yard shot. Hell, just last winter I was huntin' with my flintlock rifle when I spotted a nice buck. I rammed a charge down the barrel, then some wadding and an ounce or so of salt on top of that. Then I took careful aim and touched her off. That buck dropped like a bad habit!"

"That's very interesting," remarked one of the younger fellows, "but why put salt in your rifle?"

"Son, that deer was so far off that I had to do something to keep the meat from spoilin' before I could get to it."

- *Bob B.*

## CLEANING MUZZLE STUFFERS

When cleaning a percussion pistol, my technique is to use hot detergent water! And to get the residue out of all the works without complete disassembly, use a dash of acetone...absorbs water and then both evaporate in a flash, leaving metal ready for final oiling. Water rinse first, then use the acetone. Don't smoke near this stuff! (Note by Bob B...no smell in the world is as sweet as pumping out a muzzle loader barrel in boiling water. Such a manly odor that the wife and kids leave the house and the neighbors complain...sorta like a privy in July but without the flies.)

- *Gorman's Gun Shop, Mt. Pleasant, Michigan*



## BLACKPOWDER CLEANER

For the black powder boys, my oldest boy is into cap and ball pistols and has fallen into something real good. That cleaning preparation called "Fantastik" will clean up fouling like gang busters. He squirts some on and in, swabs it, swabs with a couple of wet patches, wipes dry and oils. I haven't had a chance to try it on smokeless powder yet but I'm going to give it a go and see what happens. Who knows, I may have stepped on a gold mine (could be a cow pie, too.)

- R.E. Dozier, Winters, California

## CLEANING M/L WITH 909

Put 4 ounces of your 909 Dicro-Clean in a quart of water and use to clean your muzzle loaders. Dry and oil with good pure, lightweight mineral. Fantastic!!

- Mike Rowe, Omak, Washington

## VINEGAR TO REMOVE POWDER RESIDUE

We've known about the immeasurable value of vinegar in the bluing room for years... best thing to come along yet to take the "bite" out of bluing salts splatters or splashes. But, the firearms expert for the local police department told me that the stuff works great to remove powder residue; so I tried it. It works best on a cotton swab with just a few strokes, soak for 20 minutes or so, and clean out. Has taken off everything I can find to try it out on so far.

- Fred Thamers, Jr., Lakeland, Florida

## CUSTOM FIT THOSE HOLSTERS

Soak the holster in cold water for about 10 minutes. Then take the handgun you want it to fit, wrap the gun in Saran Wrap, take the holster out of the water, wipe it dry and insert the handgun into it. Do a little pushing and shoving and molding of the wet leather to get the exact fit you want, and then hang the holster with the gun still in it up to dry slowly. Comes out with a perfect fit! (Very nice way to customize your holsters. Not only do they look much better, they won't wear the bluing off like a sloppy-fit holster will.)

- George Johnson, Proctor, Vermont

## LIQUID SHOE STRETCH TO FIT HOLSTERS

Had a customer's holster that was way too tight, and being very lazy and not wanting to go thru the Saran Wrap, water-soak process I decided to try Stella's Shoe Stretch... the stuff they put



on your shoes to make them stretch out and quit hurting your feet. I used it on the holster, did a beautiful job of "re-fitting" the leather and positively no signs of rust, such as you'd have to fight or worry about if using water and Saran Wrap.

- Dan Johnstone, Miami, Florida

## INSTANT DULL

The slickest way to cut down on shine on a hunting gun - be it rifle or shotgun - is to coat the metal with a nice even coat of liquid car wax... and then don't wipe it off. Anyone who has watched the spooked flip of a white tail or mulie going over the next rise knows the importance of keeping that "shine" down. And, this wax method cleans up easily, doesn't harm the most beautifully blued and engraved gun in any way, and is easy to do!

- John Stull, Lakeville, Indiana

## HOME-BREWED SUMMER SAUSAGE

This is from LaVan Walsh - the "L" so many of you have seen on the orders from us over the 25 years she was picking and packing orders for us. Her recipe is easy-to-make, and the sausage is delicious.

- 2 lbs. ground round or hamburger
- 1/4 teaspoon onion powder
- 1/4 teaspoon mustard seed
- 1/4 teaspoon cracked pepper
- 2 Tablespoons Mortons Quick Cure Salt
- 1/4 teaspoon garlic powder
- 1 Cup water

Mix well all ingredients - hands work best.

Make into rolls and wrap in foil and refrigerate for 24 hours.

Then, lay flat in pan and pour one inch of water in pan and bake one hour in foil at 350°... cool and refrigerate - ready to eat anytime.

LaVan says if 2 tablespoons of salt is too much for your taste, you can use less.

- LaVan Walsh, Montezuma, Iowa

## BELGIUM SAUSAGE

A recipe from a little gal who used to work in the art department doing layouts and copysetting for our annual catalog. This one is different than the one above, but really is great sausage!

- 5 lbs. Hamburger
- 5 rounded teaspoons Morton's Tender Quick Salt
- 2-1/2 teaspoons coarse ground pepper



2-1/2 teaspoons garlic salt

2-1/2 teaspoons mustard salt (or dry mustard)

1 teaspoon hickory salt

Mix thoroughly. Cover and refrigerate. Mix well once a day for three days. On the fourth day roll into tight rolls and bake on broiler pan for eight hours at 150°. Cool. (While cooking, be sure to turn every two hours to form an even crust.)

- Linda Moritz, Montezuma, Iowa

## OVEN-DRIED JERKY

It has been a long time since we've run Christmas recipes so here's one so good that while you're making it the saliva will drip off your chin all the time you're doing it, it smells so good...the finished product has just two things wrong with it: 1) you eat it too fast & 2) your so-called friends eat it faster! Anybody can make the stuff, so my theory is to give them a nibble and when they want more, give them the recipe and let them make their own.

This particular jerky can be made from beef - flank, brisket or top round steak - venison or the white meat from chicken or turkey. Partially freezing the meat makes it easier to slice evenly. Cut with the grain if you want your jerky chewy, across the grain for more tender, brittle jerky.

1-1/2 to 2 pounds lean, boneless meat

1/4 cup soy sauce

1 tablespoon Worcestershire

1/4 teaspoon EACH pepper & garlic powder

1/2 teaspoon onion powder

1 teaspoon hickory smoke-flavored salt

Trim and discard all fat from meat (it becomes rancid). Cut meat in 1/8 to 1/4 inch thick slices. If necessary, cut large slices to make strips about 1-1/2" wide and as long as possible.

In a bowl combine soy sauce, Worcestershire, pepper, garlic powder, onion powder and smoke-flavored salt. Stir until seasonings are dissolved. Add all the meat strips and work them thoroughly into the mix until all surfaces are well coated. (I used chop sticks but long fork handles will do.) The meat will absorb most, if not all, the liquid. Cover tightly and let stand overnight in the refrigerator. Or you can let stand one hour and proceed.

Shake off any excess liquid, arrange strips of meat close together, but no overlapping, directly on oven racks or cake racks set in shallow, rimmed pans. Dry meat in your wife's oven at the lowest possible oven setting - 150° to 200° - until it turns brown, feels hard and is dry to the touch - 5 hours for chicken & turkey, 4



to 7 hours for beef and venison. Pat off any beads of oil. Cool and store in airtight plastic bags or in jars with tight-fitting lids. Keeps in refrigerator or at room temperature indefinitely.

**AND, MAN!! IS IT EVER GOOD!!!**

Personally, I like garlic buds the best - if you have one of those herb mortar and pestle things of glass, metal or ceramic, mash up a finely diced garlic bud with the pepper, onion powder and hickory-smoked salt until it is a greyish mess. To this add the liquids and proceed.

Such food is the greatest on hunting and fishing trips - nothing but highly flavored protein - and for nibbling on when reading fishing and hunting stories it is the best there is.

*- Bob B.*

## **TWO INTREPID NIMRODS**

Two hunters were hunting for bear in Alaska. Deep in an almost impenetrable swamp they came upon the prints of a huge, unbelievably large bear. They both looked at the tracks in solemn silence. Then, one hunter looked up and said, "You go ahead and see where he's goin'. I'll go back and see where he's been!"

*- Fred Moulton, Washington, D.C.*



# INDEX

**TO USE THIS INDEX:** This Index is designed so that you can look up a topic in it and find the page listing or listings for that subject in whichever of the four *Gunsmith Kinks*® books it might appear. To make it extremely quick and easy for you, the individual book number is given in Roman numerals before the page listings, and then the page listings are given in the same type face used in each book to number the pages. Thus, a subject in the original *Gunsmith Kinks*®, for example, would look like this: I: 439. A listing in *Gunsmith Kinks*® II would appear as: II: 14. A listing in *Gunsmith Kinks*® III would be shown as: III: 21. And a listing in *Gunsmith Kinks*® 4 would be shown as: 4: 320. We sincerely hope you find this system fast and helpful.

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